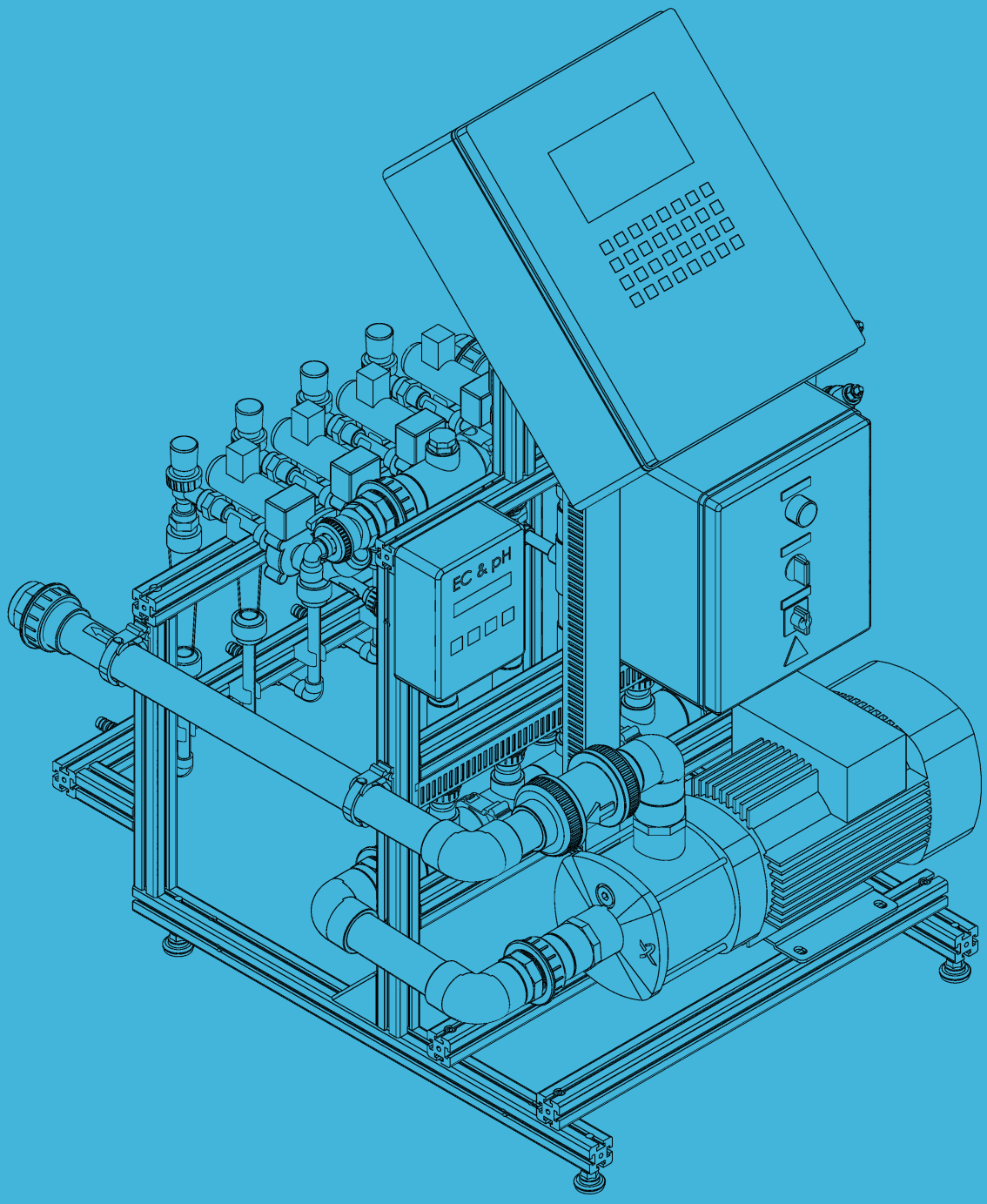
FERTIKIT 3G

INSTALLATION MANUAL



V 001.05 - JUNE 2012

NETAFIM™
GROW MORE WITH LESS

© COPYRIGHT 2012, NETAFIM

NO PARTS OF THIS PUBLICATION MAY BE REPRODUCED, STORED IN AN AUTOMATED DATA FILE OR MADE PUBLIC IN ANY FORM OR BY ANY MEANS, WHETHER ELECTRONIC, MECHANICAL, BY PHOTOCOPYING, RECORDING OR IN ANY OTHER MANNER WITHOUT PRIOR WRITTEN PERMISSION OF THE PUBLISHER.

ALTHOUGH NETAFIM TAKES THE GREATEST POSSIBLE CARE IN DESIGNING AND PRODUCING BOTH ITS PRODUCTS AND THE ASSOCIATED DOCUMENTATION, THEY MAY STILL INCLUDE FAULTS.

NETAFIM WILL NOT ACCEPT RESPONSIBILITY FOR DAMAGE RESULTING FROM THE USE OF NETAFIM'S PRODUCTS OR THE USE OF THIS MANUAL.

NETAFIM RESERVES THE RIGHT TO MAKE CHANGES AND IMPROVEMENTS TO ITS PRODUCTS AND/OR THE ASSOCIATED DOCUMENTATION WITHOUT PRIOR NOTICE.

CONTENTS

Use of symbols 6

Introduction
- General instructions 7
- Safety instructions 7
- When using acid/chemicals 8

Description
- Introduction 9
- Advantages 9
- Specifications 9
- Basic functions 10
- Operating principle 10
- Service 10
- Maintenance 10
- Add-ons 10
- The 4 modes 10
- Dimensions 15
- Weights 15

On-site preparations
- Typical setups 16
- Hydraulic infrastructure preparation 19
- Electrical preparation 24

Installation
- Unpacking and placement 25
- Hydraulic installation 25
- Electrical installation 27

System operation
- Preparations for running the FERTIKIT 28
- Running the FERTIKIT 29

Calibration
- Calculation of dosing channels opening percentage 31
- Simulation with a 10 liter (2 US gal) bucket of water 31
- Calibration of the FERTIKIT while irrigating 33

Commissioning 35

Warranty 36

Appendices
- Appendix 1 - FERTIKIT parts list 37
- Appendix 2 - Dosing booster electrical data 46

TABLES, FIGURES AND DIAGRAMS

Tables

1 Dosing channels for acid 8
2 FERTIKIT dimensions 15
3 FERTIKIT weights with dosing booster 15
4 FERTIKIT weights without dosing booster 15
5 Infrastructure - required proportions 19
6 Main line pressure and flow conditions 20
7 Components of the water distribution system 22
8 Recommended flow meter 22
9 Components of the fertilizer/acid tanks and lines 23
10 Mains wire size for single phase system 24
11 Mains wire size for three phasic system 24
12 Main line inlet/outlet types of connections 25
13 Fertilizer/acid lines types of connections 25
14 Hydraulic conditions 29
15 4 modes main parts 41
16 Dosing channel parts 42
17 Venturis 44
18 Dosing booster and its accessories 45
19 Dosing booster list for 50 Hz installations 46
20 Dosing booster list for 60 Hz installations 47

Figures

1 PD mode 11
2 PL mode 12
3 PB mode 13
4 MS mode 14
5 FERTIKIT dimensions with controller 15
6 FERTIKIT dimensions without controller 15
7 PD mode - typical setup 16
8 PL or PB mode - typical setup 17
9 MS mode - typical setup 18
10 Infrastructure - required proportions 19
11 Location of connectors - PD, PL, MS modes 21
12 Location of connectors - PB mode 21
13 Installation of air release valve 23
14 The ShockWatch label 25
15 Fertilizer/acid lines connection 26
16 Rotation of the hose connectors 26
17 The dual dosing channel 27
18 The 1000 l/hr (265 GPH) dosing valve selector 28
19 Adjustment of the Rotameter cursors 30
20 Simulation test with a 10 liter (2 US gal) bucket of water 32
21 PD mode parts 37
22 PL mode parts 38
23 PB mode parts 39
24 MS mode parts 40
25 Dosing channel parts 42
26 Venturis 44
27 Dosing booster and its accessories 45

Diagrams

1 PD mode 11
2 PL mode 12
3 PB mode 13
4 MS mode 14
5 PD mode - typical setup 16
6 PL or PB mode - typical setup 17
7 MS mode - typical setup 18
8 The dual dosing channel 27

USE OF SYMBOLS

The symbols used in this manual refer to the following:

WARNING
The following text contains instructions aimed at preventing bodily injury or direct damage to the crops, the FERTIKIT and/or the infrastructure.

CAUTION
The following text contains instructions aimed at preventing unwanted system operation, installation or conditions that, if not followed, might void the warranty.

ATTENTION
The following text contains instructions aimed at enhancing the efficiency of usage of the instructions in the manual.

NOTE
The following text contains instructions aimed at emphasizing certain aspect of the operation of the system or installation.

EXAMPLE
The following text provides an example to clarify the operation of the settings, method of operation or installation.
The values used in the examples are hypothetical. Do not apply these values to your own situation.

ELECTRICAL HAZARD
The following text contains instructions aimed at preventing bodily injury or direct damage to the FERTIKIT and/or the infrastructure in the presence of electricity.

ACID HAZARD
The following text contains instructions aimed at preventing bodily injury or direct damage to the crops, the FERTIKIT and/or the infrastructure in the presence of acid.

SAFETY FOOTWEAR
The following text contains instructions aimed at preventing foot injury.

TIP
The following text provides clarification, tips or useful information.

PROTECTIVE EQUIPMENT
The following text contains instructions aimed at preventing damage to health or bodily injury in the presence of fertilizers, acid or other chemicals.

INTRODUCTION

CAUTION
Read the Safety instructions chapter before beginning installation of the FERTIKIT dosing unit.

General instructions

- Installation must be performed by authorized technicians only.
- Refer to your supervisor if problems occur during installation procedure.
- Installation should be performed on a hard, leveled floor or on a flat, hard, leveled plate.
- Do not apply force or pressure on components during the installation procedure.
- Verify that field components work properly.
- Make sure fertilizers and acid are on site at time of installation.

Electricity

- Ensure that suitable electrical power supply is available in the vicinity of the installation for the FERTIKIT electrical connection (see - Electrical preparation, p 24).
- Ensure an electrical socket available in the FERTIKIT vicinity, for installation and for service purposes.

Safety instructions

- All safety regulations must be applied.
- Ensure that the installation is carried out in a manner that prevents leaks from the FERTIKIT, the fertilizer/acid tanks and lines, the peripherals and the accessories, contaminating the environment, soil or ambient area.
- Electrical installation must be performed by an authorized electrician only.
- The electrical installation must comply with the local safety standards and regulations.
- Protection provided by the equipment can be impaired if the equipment is used in a manner other than that specified by the manufacturer.

WARNING
In agricultural environment - always wear protective footwear.

WARNING
When handling fertilizers, acid and other chemicals, always use protective equipment, gloves and goggles.

WARNING
Measures must be taken to prevent fertilizer infiltration of the water source.

CAUTION
When opening or closing any manual valve, always do it gradually, to prevent damage to the system by water hammer.

INTRODUCTION

NOTE
The maximum sound level produced by the equipment does not exceed 70dB.

When using acid/chemicals

ACID HAZARD
When using acid/chemicals - always observe the manufacturer's safety instructions.

WARNING
When handling fertilizers, acid or other chemicals, always use protective equipment, gloves and goggles.

ATTENTION
Table 1 - When dosing acid, use a dosing channel fitted with the appropriate components according to the type and concentration of the acid used*:

		For pH correction			For maintenance of drippers		
Type of dosing channel	Diaphragm and O-rings	Nitric (HNO_3)	Phosphoric (H_3PO_4)	Sulfuric (H_2SO_4)	Hydrochloric (HCl)	Hydrogen peroxide (H_2O_2)	Chlorine (as hypochloride)
For diluted acid	EPDM	<3%	<85%	<30%	<10%	<30%	<1%
For concentrated acid	Viton	<40%	<85%	<90%	<33%	<50%	<10%

% is by weight at 21°C (70°F)

* The table indicates the resistance of the dosing channel components to acid, and is not a recommendation to use the acids mentioned.

WARNING
Exceeding the above acid concentrations will damage the dosing channels.

WARNING
Substances such as chemicals for pest/disease control might be corrosive and damage the FERTIKIT. When using any substance other than fertilizers or acids not exceeding the concentrations in table 1 above, always observe the manufacturer's instructions for corrosivity. In case of any doubt, consult your Netafim representative.

DESCRIPTION

Introduction

The FERTIKIT 3G is a fully configurable, highly cost-effective solution for precise Nutrigation™.
Based on a standard platform, the FERTIKIT 3G can operate under various modes and accommodate a variety of dosing channels, dosing boosters, controllers, peripherals and accessories to meet a vast range of applications and infrastructure constrains.
The aim of this manual is to enable installers to install and commission the FERTIKIT 3G dosing unit.
The operating and maintenance instructions are described in the User Manual.

Advantages

- A modular Nutrigation™ system for soil or substrate applications with minimum investment
- Efficient usage of water, fertilizers and energy
- Unrivaled range of irrigation water capacities
- Designed for any application where quantitative or proportional Nutrigation™ is required
- Highly profitable price/performance ratio
- Venturi operating principle - no moving parts
- Fits easily into any existing irrigation system
- Precise Nutrigation™ based on high-accuracy dosing channels
- Quick action dosing valves
- Available with up to 6 fertilizer/acid dosing channels
- Nutrigation™ recipes can be changed quickly and efficiently
- Can be operated manually or fully computerized
- NMC and other controllers can be assembled on the FERTIKIT for advanced Nutrigation™ control
- A wide variety of accessories and peripherals can be integrated into the FERTIKIT to enhance its functions
- High-quality components and PVC pipe work
- Aluminum, corrosion-resistant frame with adjustable legs
- Easy to install and to maintain
- Made by Netafim

Specifications

Capacity range

The FERTIKIT ensures a satisfactory mixture in an extremely vast range of flow capacities.
It will accommodate a 0.1 Ha (0.25 Acres) nursery or a 400 Ha (1000 Acres) sugar cane plantation.

Fertilizer dosing capacity

The FERTIKIT's basic platform accommodates up to 6 dosing channels of various types:

- 50 l/hr (13 GPH)
- 150 l/hr (40 GPH)
- 400 l/hr (106 GPH)
- 600 l/hr (158 GPH)
- 1000 l/hr (265 GPH)

* For applications requiring more than 6 dosing channels - consult Netafim.

Main line pressure range

Typical main line pressure ranges and conditions, by mode:

PD - For applications where there is sufficient pressure differentiation on the main line between the source pressure and the required pressure downstream from the FERTIKIT.

PL - For applications where the main line pressure is between 2.5 and 6.5 bars (36-94 PSI) and sufficient for irrigation with no excess.

PB - For applications where the main line pressure is between 1 and 2.5 bars (14.5-36 PSI) and sufficient for irrigation with no excess.

MS - For applications where the pressure downstream the main line pump is between 2 and 8 bars (29-116 PSI).

DESCRIPTION

Basic functions

The FERTIKIT supports the following Nutrigation™ functions:

- Fully controlled dosing and mixing of fertilizers/acid with source water into a homogenous nutrient solution.
- EC/pH correction of the nutrient solution.
- Water pre-treatment

Operating principle

The FERTIKIT doses the various fertilizers and acid into a homogeneous solution and injects it into the irrigation water main line. The suction of the fertilizers and acid in the dosing channels is based on the Venturi principle. This requires a pressure differentiation - available on the main line or supplied by the main line pump or the FERTIKIT's dosing booster.

Service

Servicing the FERTIKIT 3G is a prompt and simple process. The dealer keeps a small quantity of interchangeable components on hand, for replacement on site within a few minutes.

Maintenance

To prevent failures and extend the life cycle of the FERTIKIT, regular maintenance must be carried out by the user, such as periodic rinsing of filters and calibration of the EC/pH sensors. For full maintenance instructions, see Maintenance in the User Manual.

Add-ons

The FERTIKIT functionality can be extended by means of the many add-ons offering a wide variety of useful functions. All the add-ons are easy to connect to the FERTIKIT - here are a few examples:

Fertilizer meter

Enables continuous reading of fertilizer dosing. Useful in applications where EC/pH control is not performed.

Anti-siphon valve

Prevents gravitational flow of fertilizers to the main line when the system is idle.

Head control

A kit consisting of a water filter, a water meter and a main valve - installable on the main line, providing assigned connectors to the FERTIKIT's inlet and outlet, and assuring full integration with the FERTIKIT.

Stock selection

Enables the dosing of multiple fertilizers through a single dosing channel (in cases they where simultaneous dosing is not required).
Available in a wide variety of configurations, from a single dosing channel with 2 fertilizers to as many dosing channels and fertilizers as required.

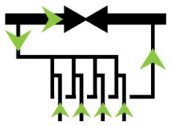
For further information on the FERTIKIT add-ons, consult Netafim.

The 4 modes

The FERTIKIT 3G offers 4 different operation modes, selectable according to the site's conditions, in order to maximize usage of vacant irrigation water flow rate and pressure on the main irrigation line, ensuring the highest efficiency with minimum investment.

DESCRIPTION

PD



For applications where there is sufficient pressure differentiation on the main line between the source pressure and the required pressure downstream from the FERTIKIT.

Applicable also in cases where there is no electricity on the site.
Can be controlled by a DC latch controller, fed by a 12 VDC battery with a solar panel.

Saves the need for a dosing booster.

Total fertilizer/acid suction capacity - up to 1000 l/hr (265 GPH)

Accommodates a wide variety of dosing channels for fertilizer and concentrated/diluted acid:
Up to 4 dosing channels, from 50 l/hr (13 GPH) each, up to 250 l/hr (66 GPH) each.

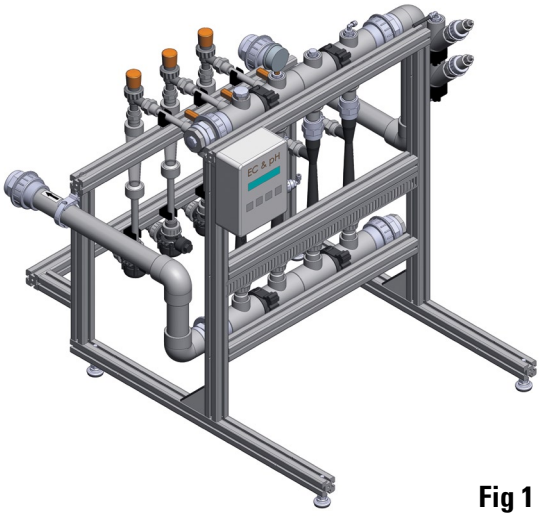
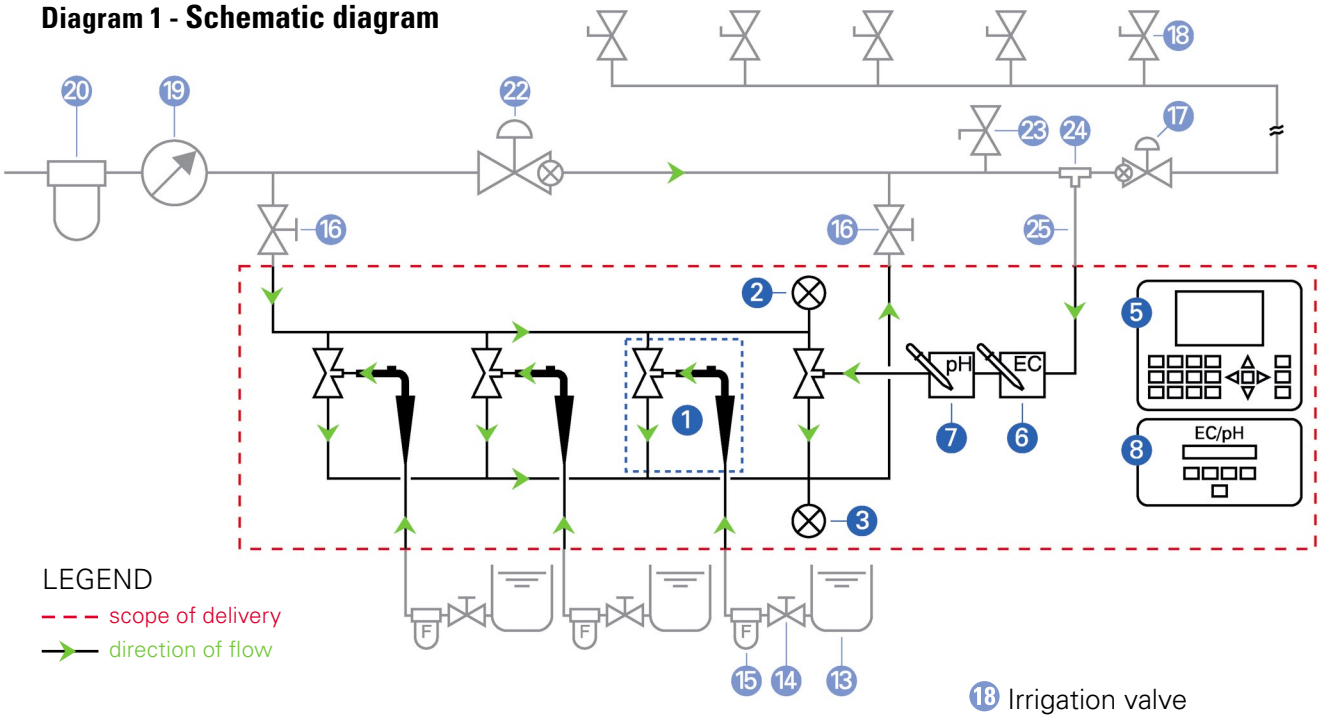


Fig 1

Diagram 1 - Schematic diagram



LEGEND
- scope of delivery
- direction of flow

1. Dosing channel + Venturi
2. Upper manifold pressure gauge
3. Lower manifold presure gauge
5. Controller
6. EC sensor
7. pH sensor
8. EC/pH transducer
13. Fertilizer/acid stock tank
14. Manual valve (fertilizer)
15. Fertilizer/acid filter
16. Manual valve (isolation)
17. Pressure sustaining valve
18. Irrigation valve
19. Water meter
20. Main line filter
22. Pressure reducing valve
23. Sampling valve
24. Saddle fitting
25. Command tube

DESCRIPTION

PL

For applications where the main line pressure is between 2.5 and 6.5 bars (36-94 PSI) and is sufficient for irrigation with no excess.

The pressure differentiation required to generate fertilizer suction via the Venturis is produced by a suction pump integrated in the Fertikit.

This mode of operation, where the lower manifold is under low pressure (around 0 bar), permits the use of high-efficiency Venturis with high suction capacity and low consumption.

Total fertilizer/acid suction capacity - up to 6000 l/hr (1585 GPH)

Accommodates a wide variety of dosing channels for fertilizer and concentrated/diluted acid: Up to 6 dosing channels, from 50 l/hr (13 GPH) each, up to 1000 l/hr (265 GPH) each.

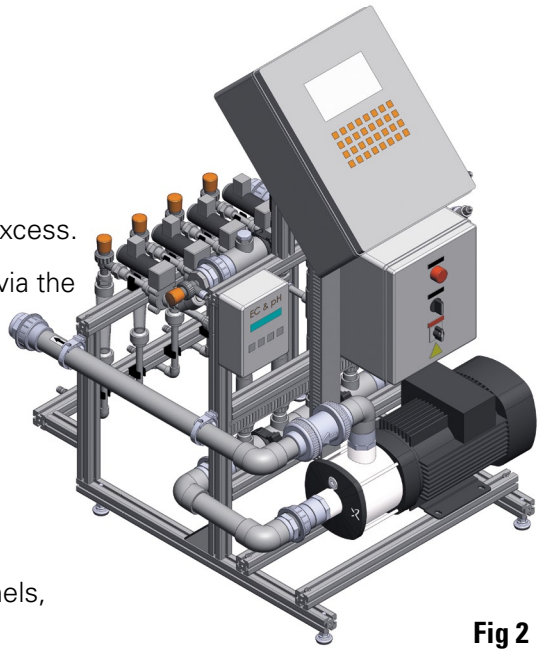
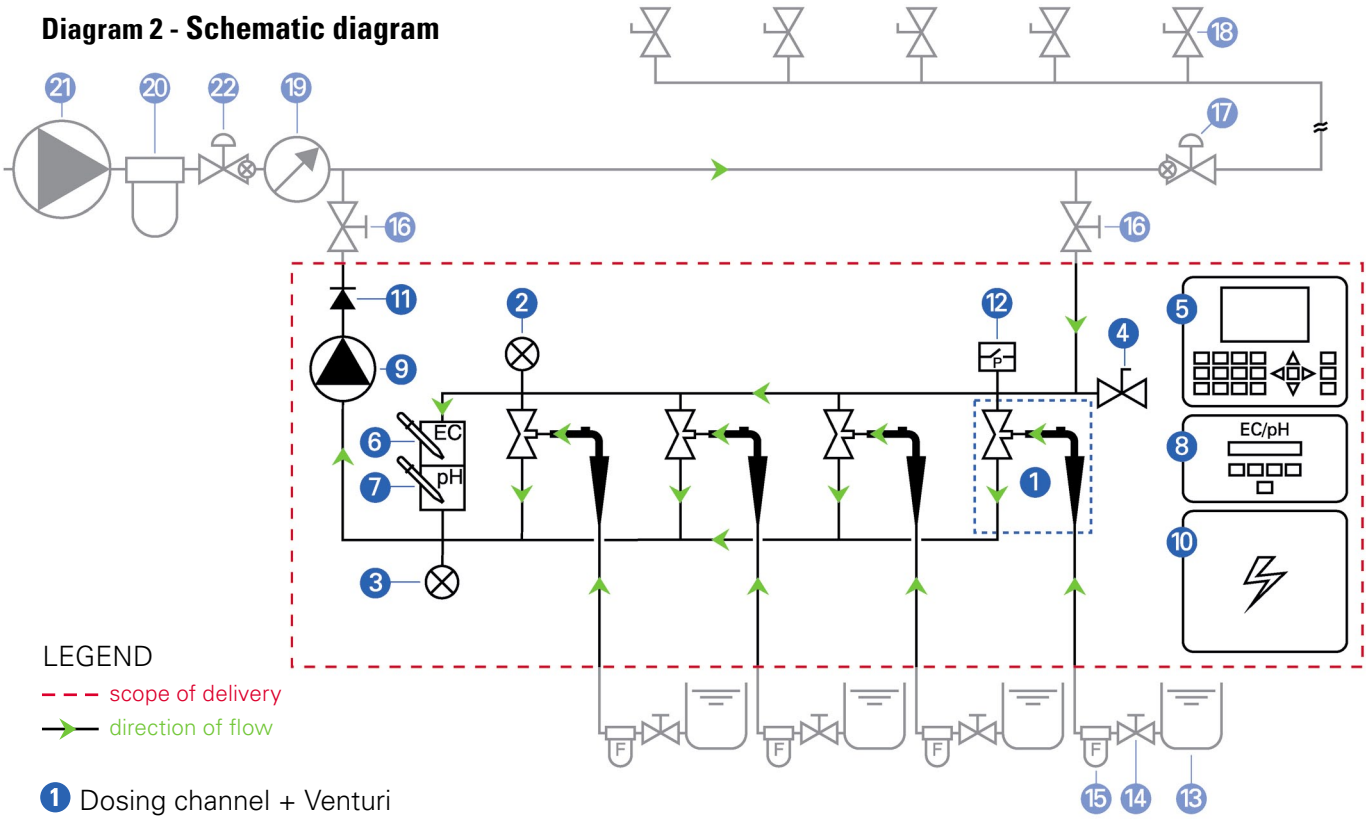


Fig 2

Diagram 2 - Schematic diagram



LEGEND

- scope of delivery
- direction of flow

1. Dosing channel + Venturi
2. Upper manifold pressure gauge
3. Lower manifold presure gauge
4. Sampling valve
5. Controller
6. EC sensor
7. pH sensor
8. EC/pH transducer
9. Dosing booster
10. Dosing booster switchbox
11. Check valve
12. Pressure switch
13. Fertilizer/acid stock tank
14. Manual valve (fertilizer)
15. Fertilizer/acid filter
16. Manual valve (isolation)
17. Pressure sustaining valve
18. Irrigation valve
19. Water meter
20. Main line filter
21. Main line pump
22. Pressure reducing valve

DESCRIPTION

PB

For applications where the main line pressure is between 1 and 2.5 bars (14.5-36 PSI) and is sufficient for irrigation with no excess.

The pressure differentiation required to generate fertilizer suction via the Venturis is produced by a boost pump integrated in the Fertikit.

This mode of operation, where the system pump is installed upstream from the Venturis, permits the use of a smaller pump, reducing the investment required and saving energy.

Total fertilizer/acid suction capacity - up to 600 l/hr (158 GPH)

Accommodates a wide variety of dosing channels
for fertilizer and concentrated/diluted acid: Up to 4 dosing channels, from 50 l/hr (13 GPH) each, up to 150 l/hr (40 GPH) each.

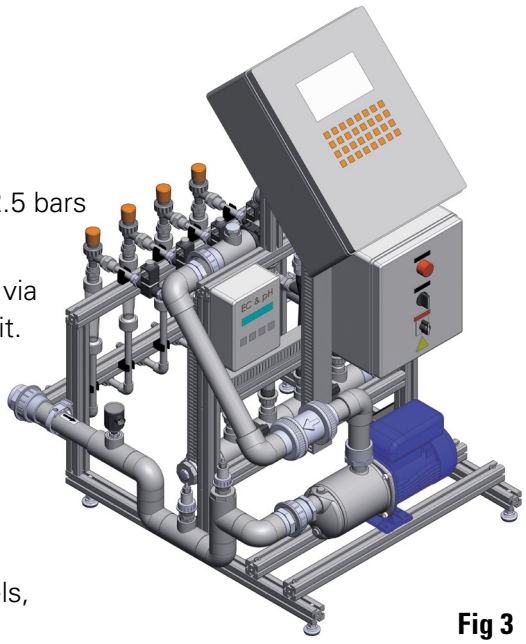
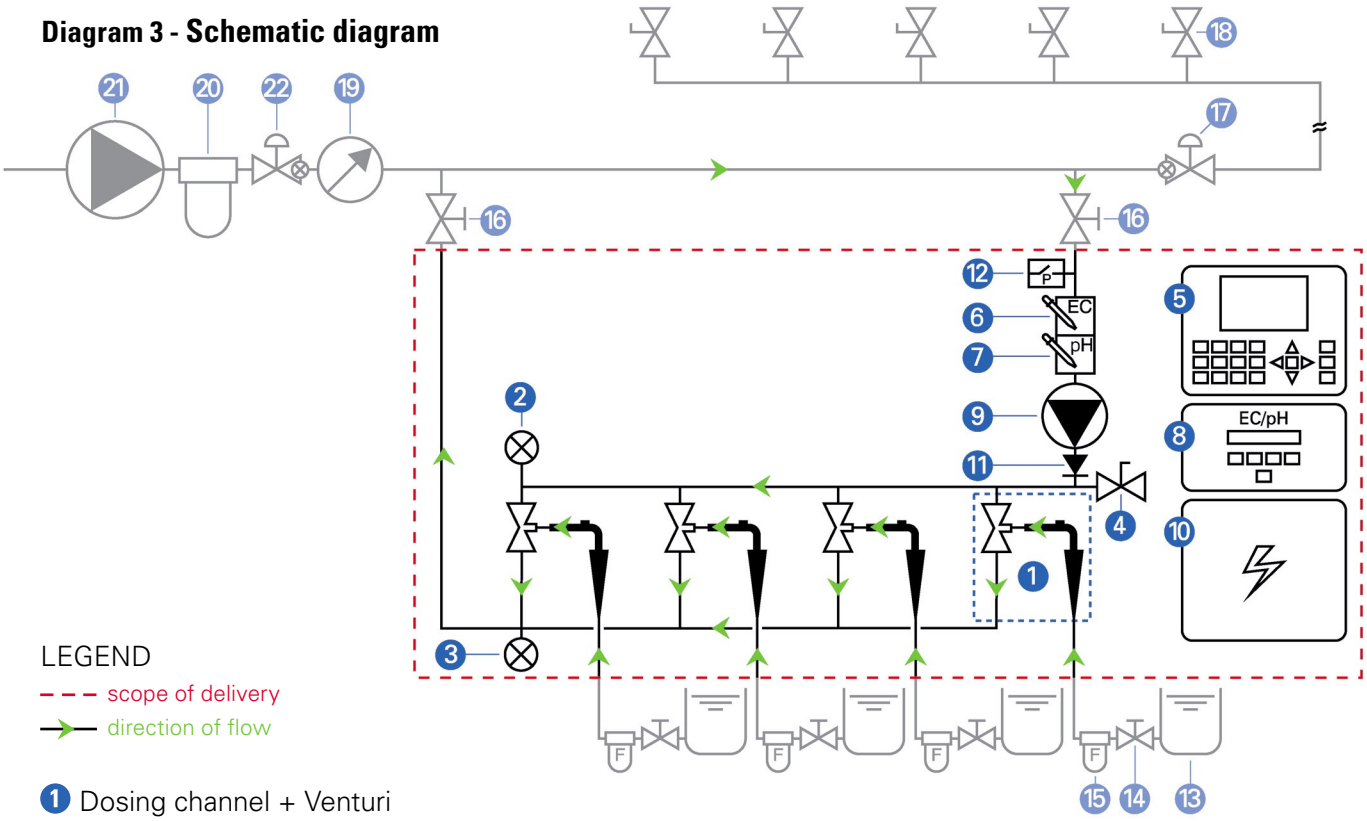


Fig 3

Diagram 3 - Schematic diagram



LEGEND

- – – – scope of delivery
- ——→ direction of flow

1. Dosing channel + Venturi
2. Upper manifold pressure gauge
3. Lower manifold presure gauge
4. Sampling valve
5. Controller
6. EC sensor
7. pH sensor
8. EC/pH transducer
9. Dosing booster
10. Dosing booster switchbox
11. Check valve
12. Pressure switch
13. Fertilizer/acid stock tank
14. Manual valve (fertilizer)
15. Fertilizer/acid filter
16. Manual valve (isolation)
17. Pressure sustaining valve
18. Irrigation valve
19. Water meter
20. Main line filter
21. Main line pump
22. Pressure reducing valve

DESCRIPTION

MS

For applications where there is a pump on the main line and it is possible to connect to the main line upstream from the pump.

Saves the need for a dosing booster.

Total fertilizer/acid suction capacity -
up to 6000 l/hr (1585 GPH)

Accommodates a wide variety of dosing channels for fertilizer and concentrated/diluted acid:
Up to 6 dosing channels,
from 50 l/hr (13 GPH) each, up to 1000 l/hr (265 GPH) each.

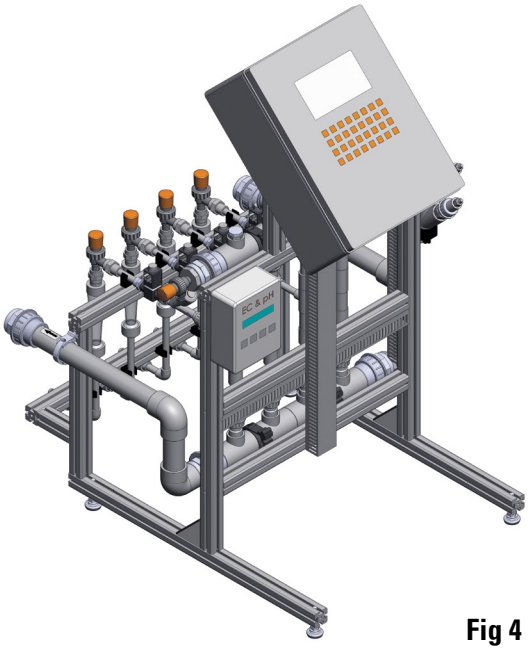
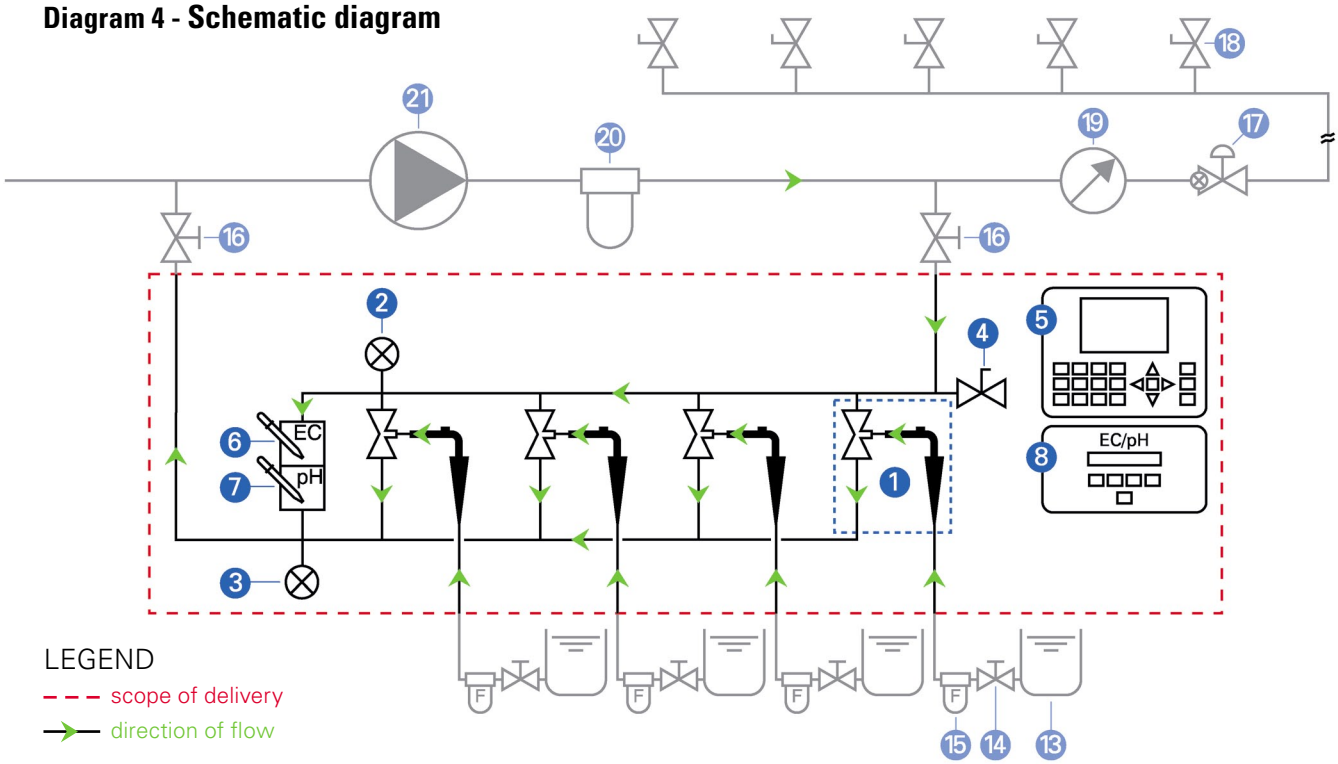


Fig 4

Diagram 4 - Schematic diagram



LEGEND
- – – – scope of delivery
- ——→ direction of flow

1. Dosing channel + Venturi
2. Upper manifold pressure gauge
3. Lower manifold presure gauge
4. Sampling valve
5. Controller
6. EC sensor
7. pH sensor
8. EC/pH transducer
13. Fertilizer/acid stock tank
14. Manual valve (fertilizer)
15. Fertilizer/acid filter
16. Manual valve (isolation)
17. Pressure sustaining valve
18. Irrigation valve
19. Water meter
20. Main line filter
21. Main line pump

DESCRIPTION

Dimensions

Fig 5 - With controller

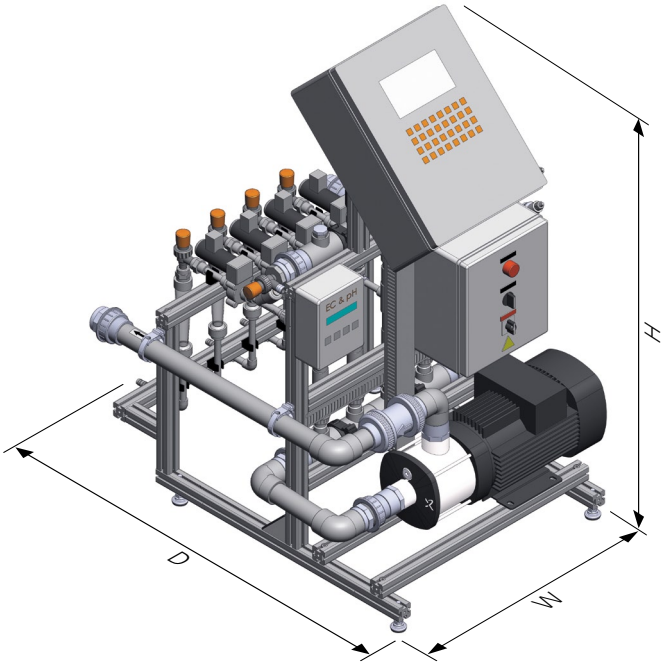


Fig 6 - Without controller

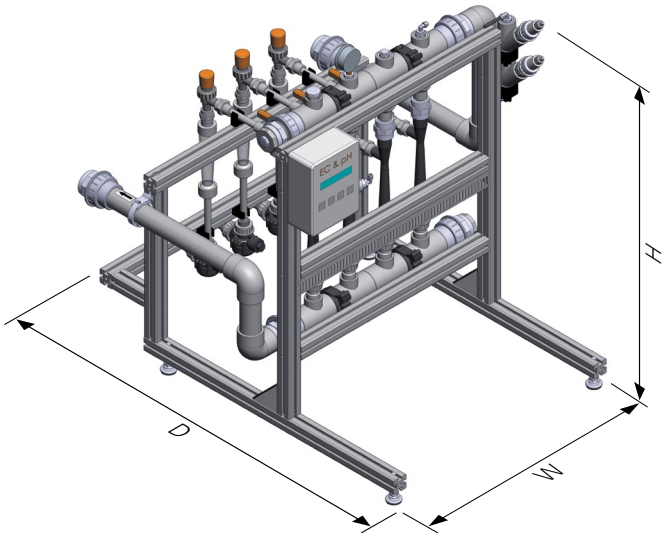


Table 2

Configuration	FERTIKIT external dimensions (W/D/H*)	Package dimensions (W/D/H**)
Without controller	84/103/92 cm (33/40.5/36")	100/115/100 cm (39.5/45.5/39.5")
With controller	84/103/134.5 cm (33/40.5/53")	100/115/161 cm (39.5/45.5/63.5")

*The height varies by ±1 cm (±0.5") according to the adjustment of the legs.

**The package height includes the pallet height of 15 cm.

Weights°

Table 3 - With dosing booster°°

Mode	Controller	4HM9		CM5		CM15	
		Net weight	Packed weight	Net weight	Packed weight	Net weight	Packed weight
PB or PL	Without	50 kg. (110 lbs.)	75 kg. (165 lbs.)	63 kg. (139 lbs.)	88 kg. (194 lbs.)	90 kg. (198 lbs.)	115 kg. (254 lbs.)
	With	60 kg. (132 lbs.)	88 kg. (194 lbs.)	73 kg. (161 lbs.)	101 kg. (223 lbs.)	100 kg. (220 lbs.)	128 kg. (282 lbs.)

°°Dosing boosters regularly in stock - for the weight of FERTIKITs with other dosing boosters - consult Netafim.

Table 4 - Without dosing booster

Mode	Controller	Net weight	Packed weight
PD or MS	Without	33 kg. (73 lbs.)	58 kg. (128 lbs.)
	With	43 kg. (95 lbs.)	71 kg. (157 lbs.)

°Order of magnitude only - final weights will be issued with the product order.

ON-SITE PREPARATIONS

Typical setups

The on-site preparations should be performed according to the mode of the FERTIKIT to be installed. Before performing the infrastructure installation, consult the 'Typical setup' of the specific mode of the FERTIKIT to be installed.

Fig 7 - PD mode - typical setup

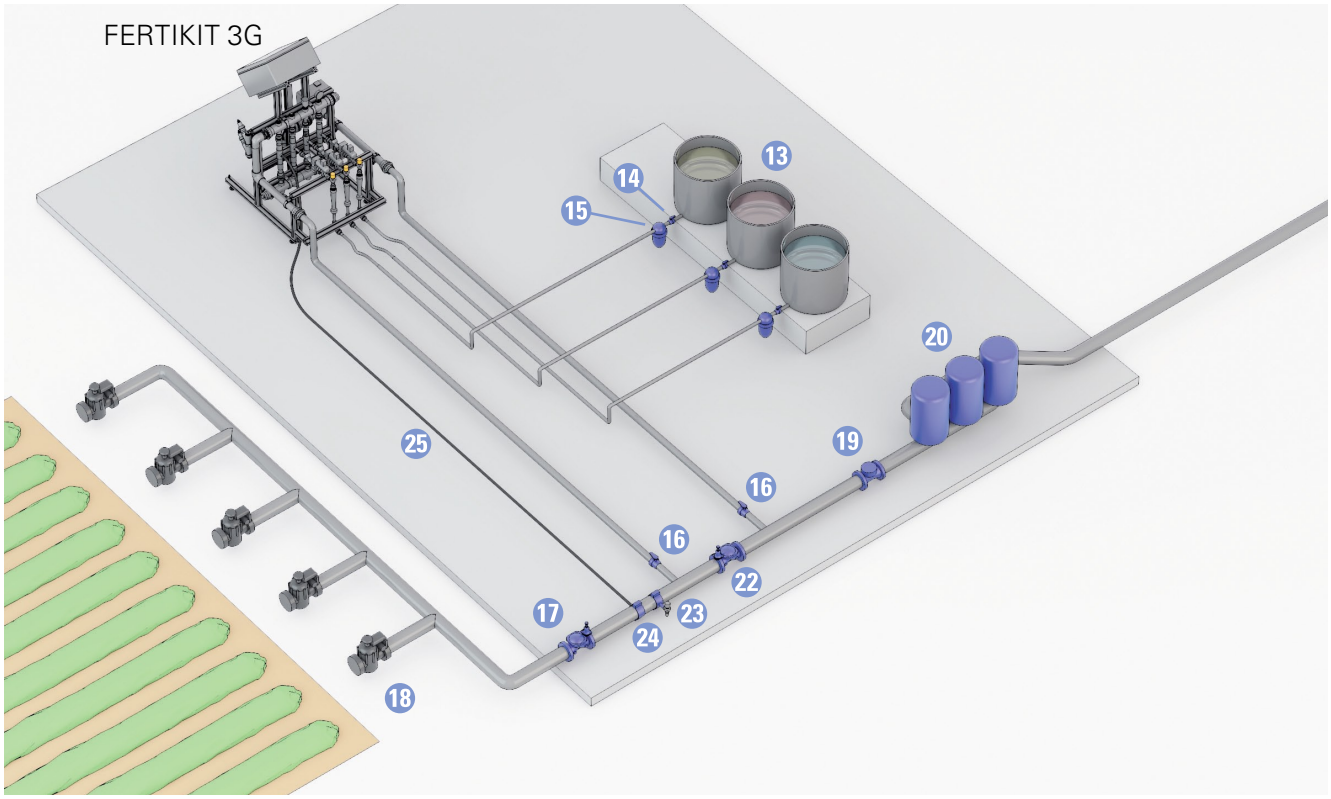
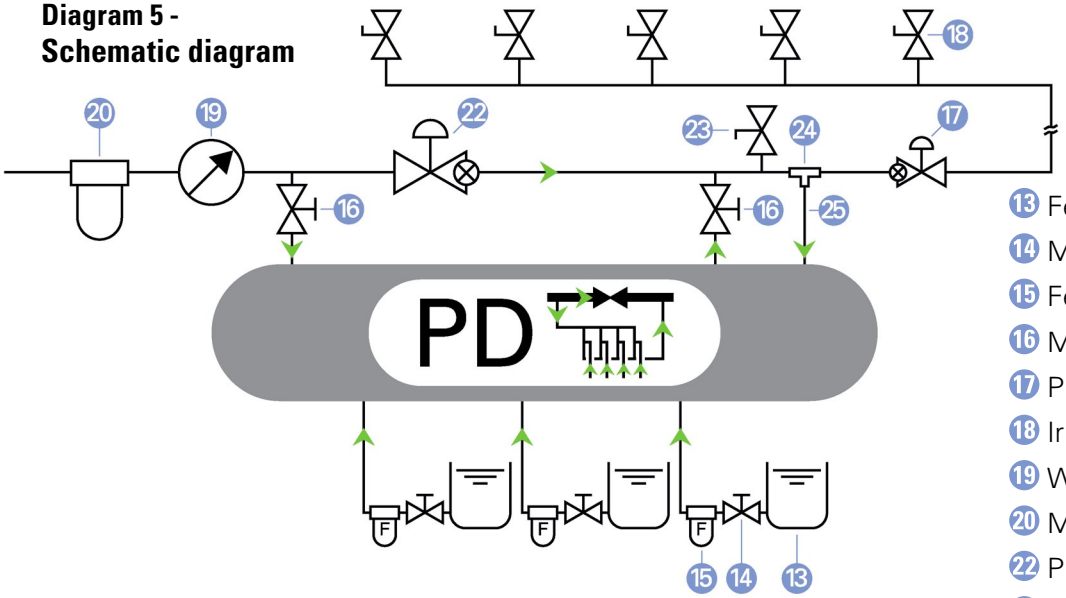


Diagram 5 - Schematic diagram



13 Fertilizer/acid stock tank
14 Manual valve (fertilizer)
15 Fertilizer/acid filter
16 Manual valve (isolation)
17 Pressure sustaining valve
18 Irrigation valve
19 Water meter
20 Main line filter
22 Pressure reducing valve
23 Sampling valve
24 Saddle fitting
25 Command tube

LEGEND
→ direction of flow

Fig 8 - PL or PB mode - typical setup

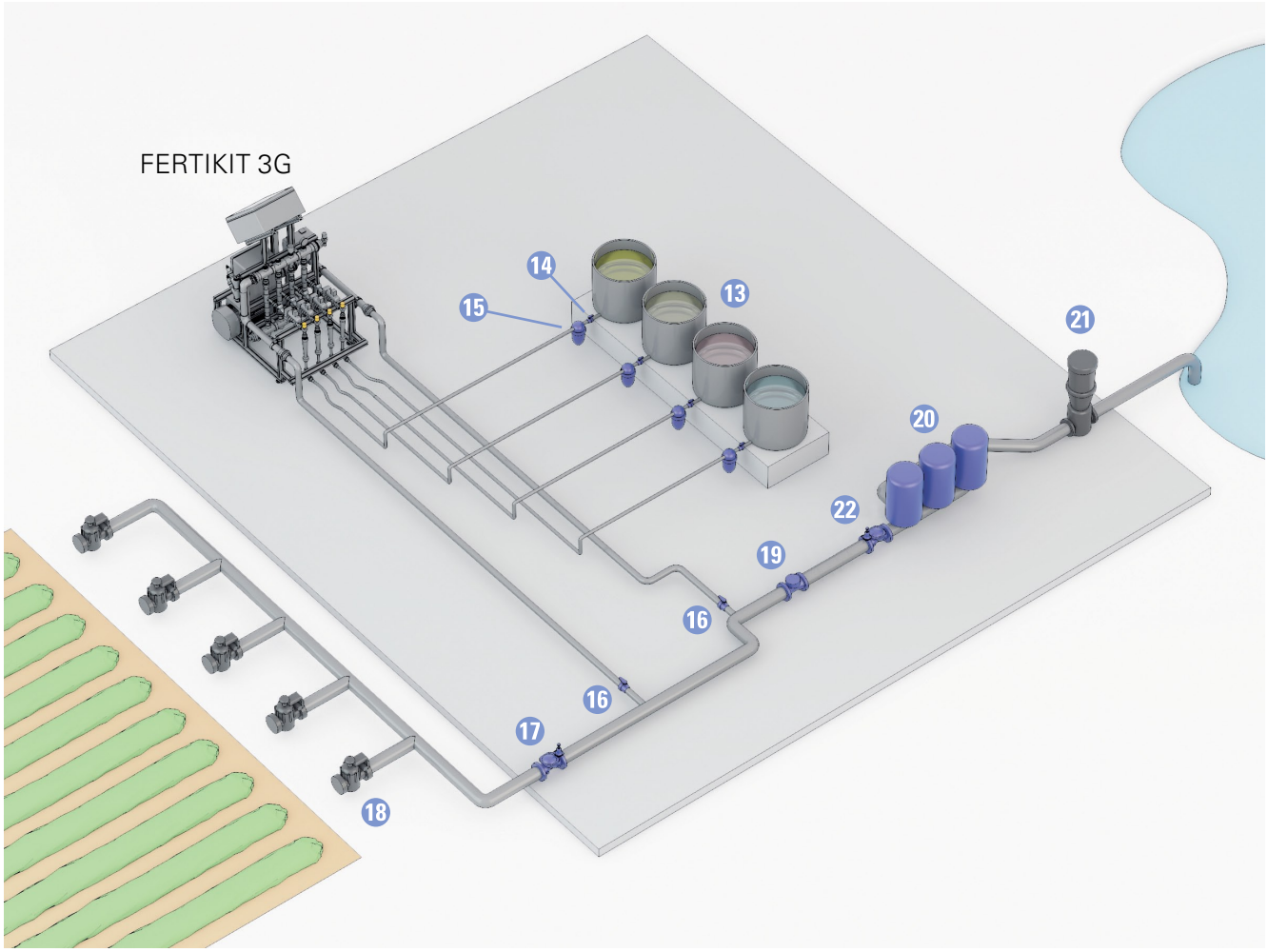
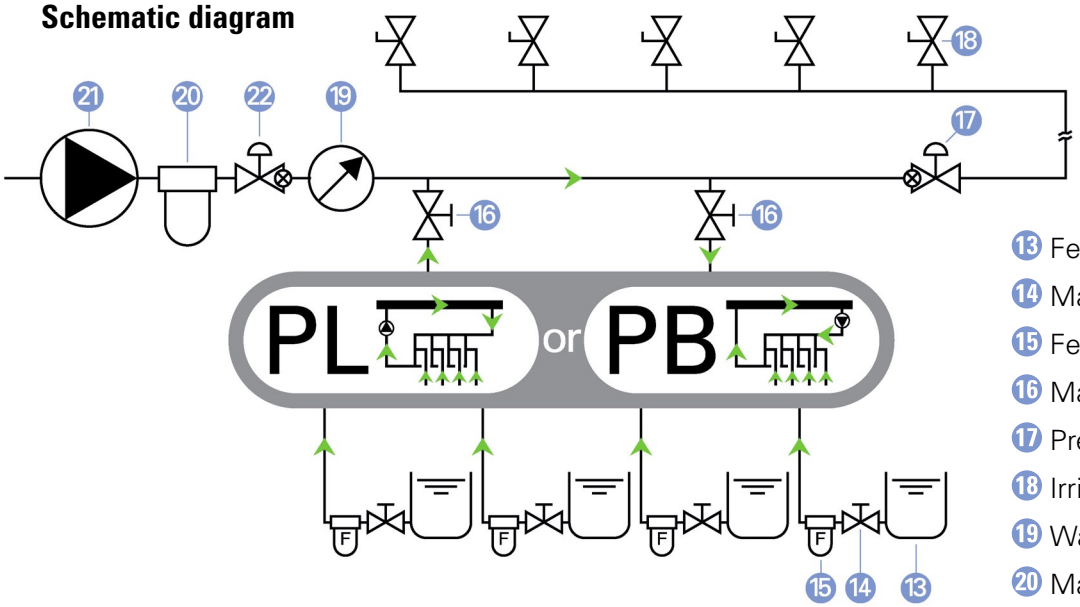


Diagram 6 - Schematic diagram



LEGEND

→ direction of flow

13 Fertilizer/acid stock tank
14 Manual valve (fertilizer)
15 Fertilizer/acid filter
16 Manual valve (isolation)
17 Pressure sustaining valve
18 Irrigation valve
19 Water meter
20 Main line filter
21 Main line pump
22 Pressure reducing valve

Fig 9 - MS mode - typical setup

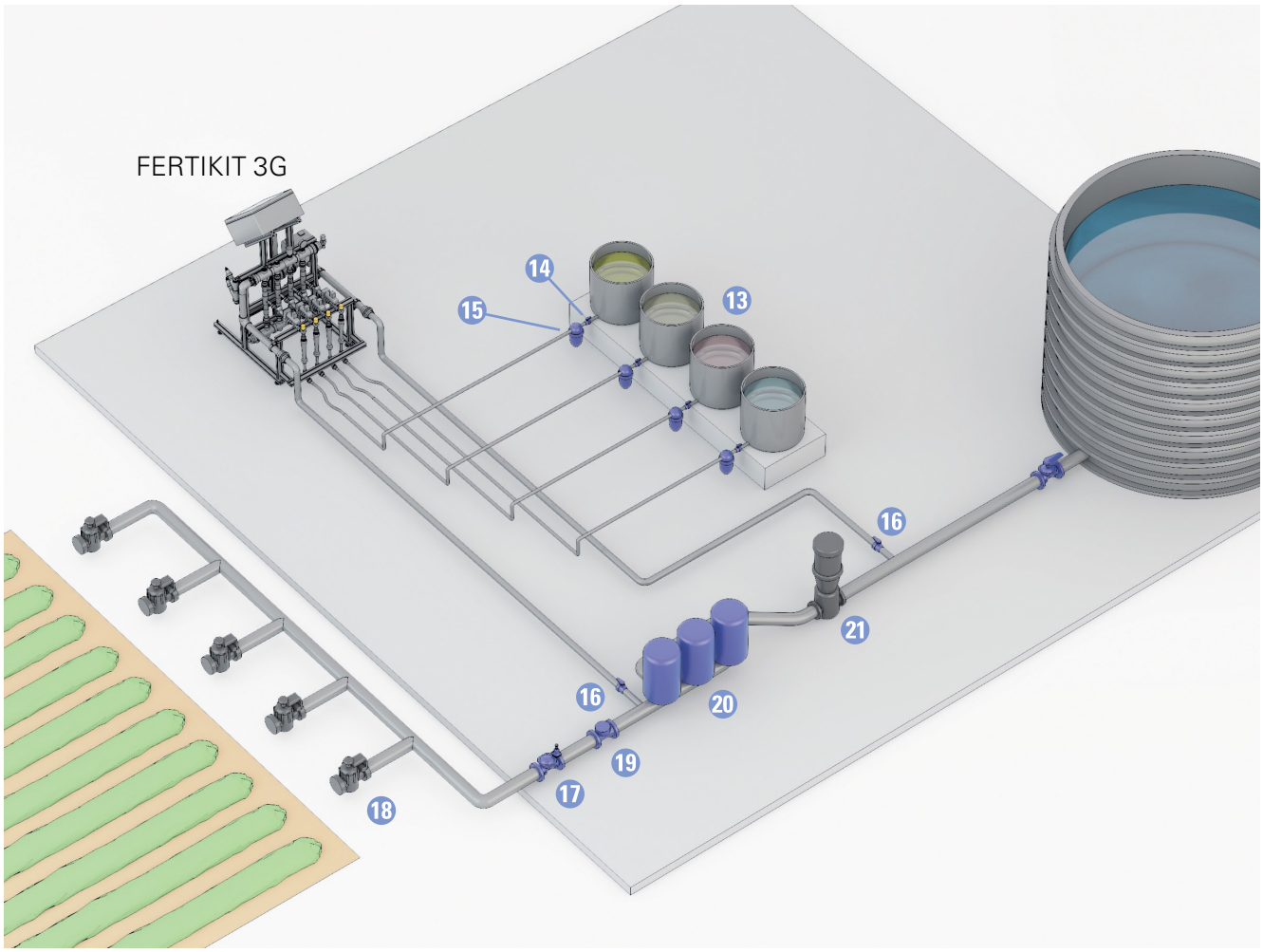
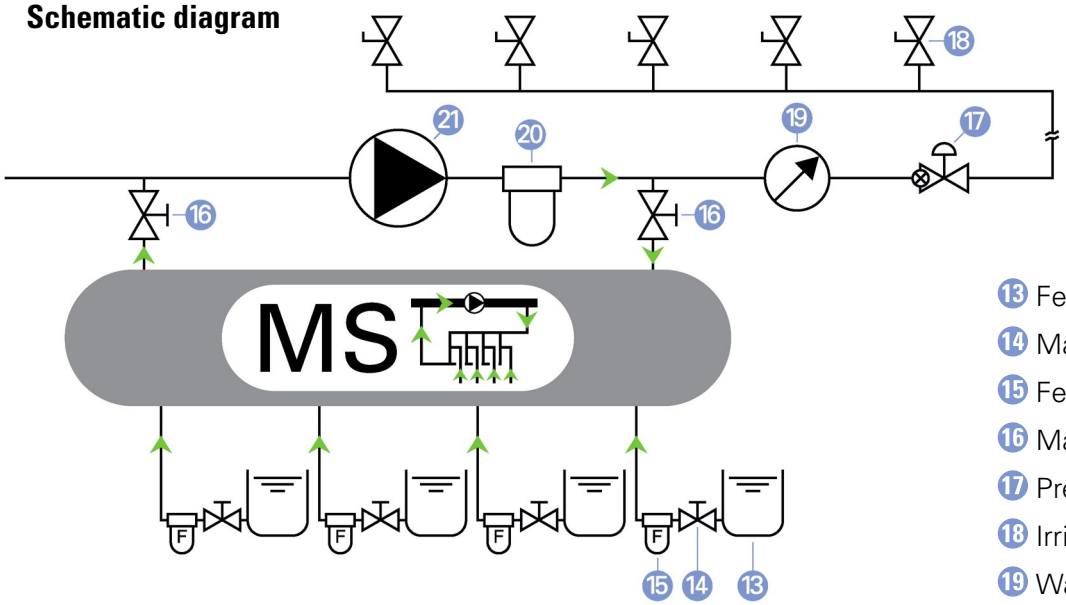


Diagram 7 - Schematic diagram



LEGEND

→ direction of flow

13 Fertilizer/acid stock tank
14 Manual valve (fertilizer)
15 Fertilizer/acid filter
16 Manual valve (isolation)
17 Pressure sustaining valve
18 Irrigation valve
19 Water meter
20 Main line filter
21 Main line pump

ON-SITE PREPARATIONS

Hydraulic infrastructure preparation

Fig 10 - Required proportions

To enable optimal operation of the FERTIKIT, piping must be installed while maintaining the following proportions.

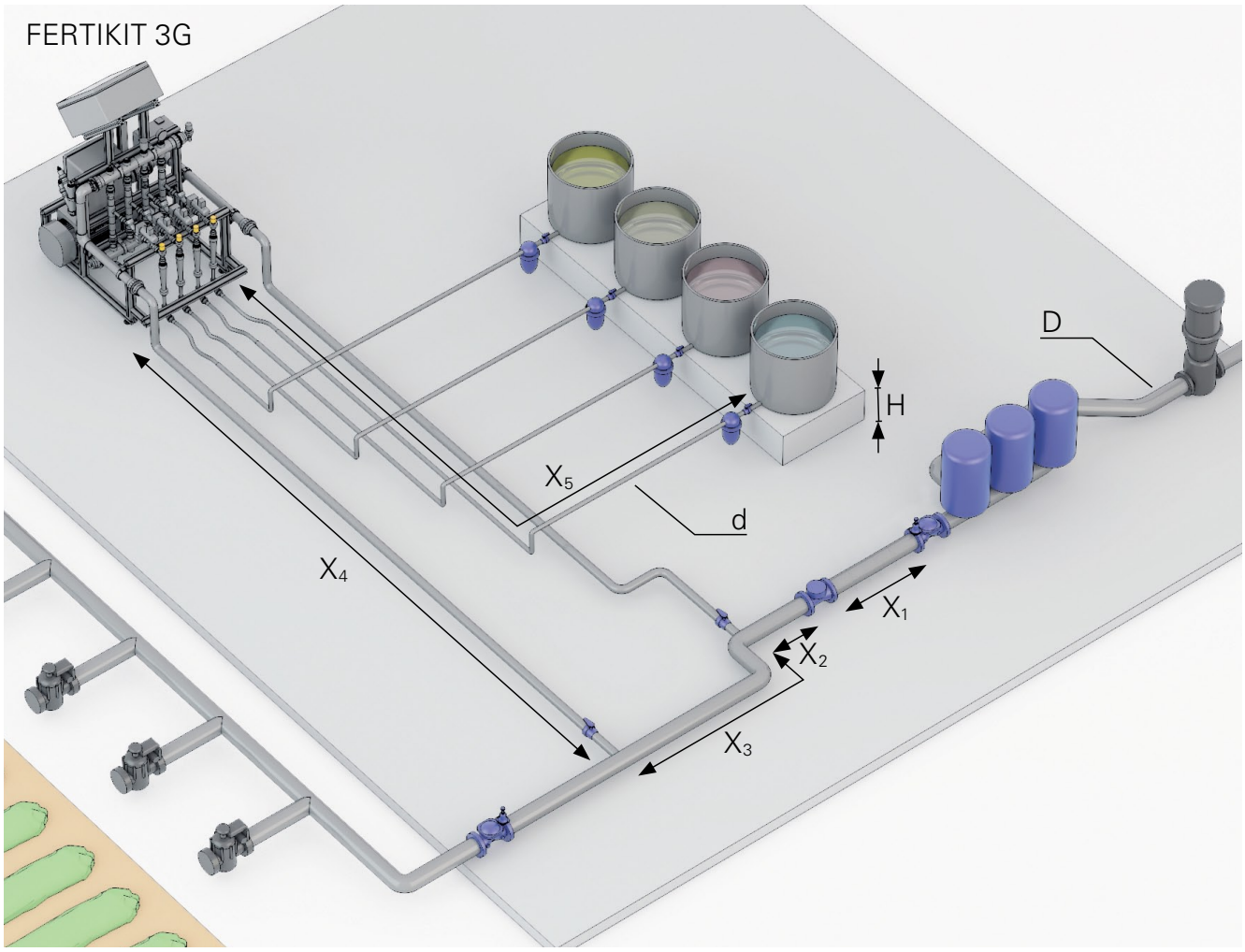


Table 5 - Infrastructure required proportions

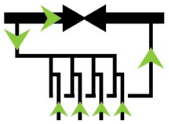
Description		Required proportions
D	Main line - pipe diameter	
d	Fertilizer/acid lines - pipe diameter: • 32 mm (1¼") for dosing channels of up to 400 l/hr (106 GPH) • 40 mm (1½") for dosing channels of over 400 l/hr (106 GPH)	
X_1	Distance between main line PRV and water meter • Pipe must be straight	10 x D
X_2	Distance between water meter and location of outlet on the main line • Pipe must be straight	5 x D
X_3	Distance between inlet and outlet locations on the main line. • For PB or PL modes only - "L" shape recommended for better mixing	Minimum 2 meter (6.5 feet)
X_4	Length of inlet and outlet pipes	Less than 3 meter (10 feet)
X_5	Length of fertilizers or acid lines	Less than 10 meter (33 feet)
H	Elevation of the fertilizer/acid tanks	Higher than 30 cm (12")

ON-SITE PREPARATIONS

System capacity requirements

In order to enable the FERTIKIT operation, the following requirements must be met.

Table 6 - Main line pressure and flow conditions

Mode	Main line pressure and flow conditions
PD 	There is sufficient pressure differentiation between the source pressure and the required pressure downstream from the FERTIKIT. The pressure upstream from the PRV is at least twice the pressure downstream from the PRV.
PL	2.5 - 6.5 bars (36-94 PSI) and sufficient for irrigation with no excess.
PB	1 - 2.5 bars (14.5-36 PSI) and sufficient for irrigation with no excess.
MS	Pressure downstream the main line pump: 2 - 8 bars (29-116 PSI) and possibility of connection to the main line upstream from the pump. The main line pump capacity ≥ Q of the largest shift + TC at the required pressure for irrigation.

NOTE

To ensure flow rate stability, the consumption of the individual irrigation shifts should be as equal as possible. Each changeover between shifts with different consumption will result in consumption fluctuation that will affect the EC and pH stability. The consumption of the smallest shift should not be less than 75% of the consumption of the largest shift.

Pump house (Filter house / Fertilizer house) requirements

CAUTION

The FERTIKIT should:

- be placed in a roofed building
- not be exposed to direct sunlight
- kept at an ambient temperature between 10°C and 40°C (50°F and 104°F)
- kept at a maximum relative air humidity of 85%
- be properly ventilated
- be protected from dust
- be protected from splashes or direct spraying with water or chemicals

NOTE

In order to prevent penetration of fertilizer or acid to the soil, it is recomended that the floor of the pump house have a slope of minimum 1% towards a gutter at its lower edge and an underground tank at the lower end of the gutter, enabling drainage of any spill or excess.

Location of inlet, outlet and fertilizer/acid line connectors

Fig 11 - PD, PL and MS modes

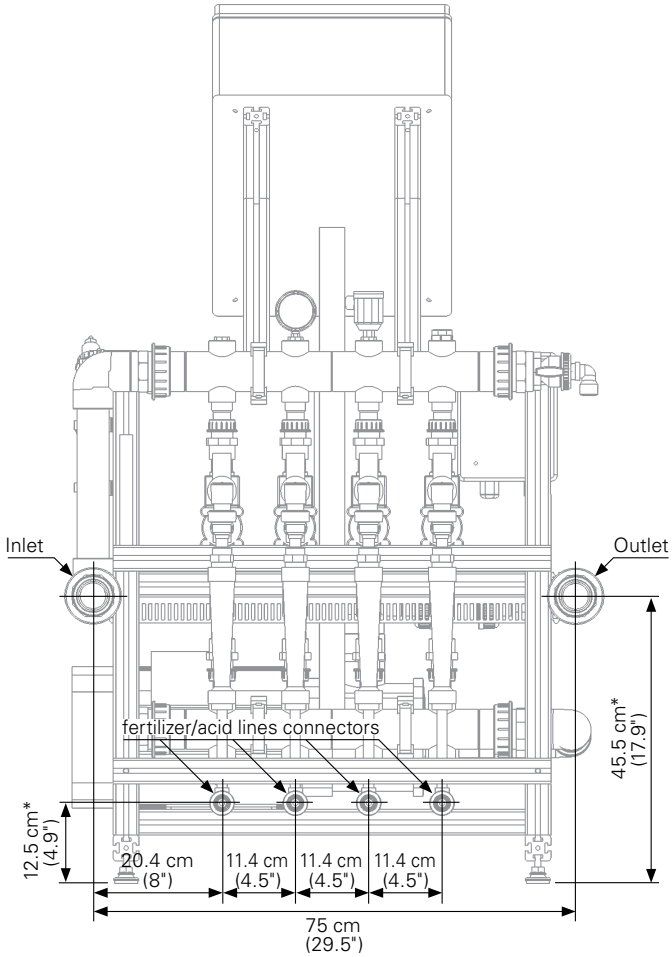
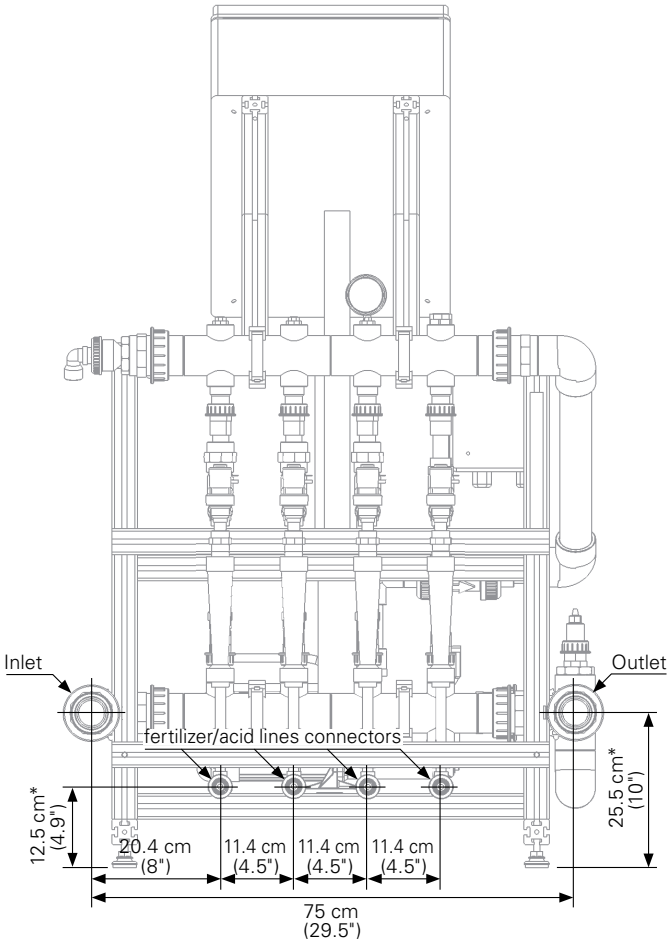


Fig 12 - PB mode



*The height varies by ±1 cm (±0.5") according to the adjustment of the legs.

ON-SITE PREPARATIONS

The water distribution system

For the setup of the water distribution system the following components should be installed (according to the mode of the FERTIKIT):

Table 7 - Components of the water distribution system

Component	Specifications
16 Manual valve (isolation)	To be installed at the inlet and at the outlet of the FERTIKIT, for use during system maintenance.
17 Pressure sustaining valve (PSV)	To be installed on the main line downstream from the FERTIKIT and able to sustain a constant pressure at the intake of the FERTIKIT, regardless of pressure changes in the field. Should be calibrated to 3-4 bars (43-58 PSI) for most projects.
18 Irrigation valve	Remote controlled (recommended).
19 Water meter	With electrical pulses. The pulse should be as short as possible according to the main line diameter and the controller's limitations. (See Recommended flow meter, table 8 below)
20 Main line filter	≤ 130 µm (≥ 120 mesh).
21 Main line pump	Suitable for the required pressure and flow rate according to the mode of the FERTIKIT and the field requirements (Ensure stable pressure).
22 Pressure reducing valve (PRV)	In the **PL** or **PB** mode - Should be installed on the main line, between the main line filters and the water meter and be able to reduce the main line pressure as specified for **PL** or **PB** modes (pages 12-13). In **PD** mode only - Should be installed on the main line, between the inlet and the outlet of the FERTIKIT and be able to reduce the main line pressure as specified for the **PD** mode (page 11).
23 Sampling valve	In **PD** mode only - Should be installed on the main line, downstream from the FERTIKIT's outlet (in all other modes the sampling valve is built-in).
24 Saddle fitting	In **PD** mode only - Should be installed on the main line, downstream from the sampling valve, equipped with a 3/4" outlet for the EC/pH sampling point.
25 Command tube	In **PD** mode only - Should be installed on the main line, downstream from the outlet of the EC/pH sampling point.

CAUTION

For **PL** and **MS** modes only:
Since EC and pH sensors must never be exposed to pressure greater than 6 bars (87 PSI), if EC and pH sensors are present on the FERTIKIT and the main line pressure is higher than 5 bars (72 PSI), a 1½" PRV must be installed on the main line, upstream from the FERTIKIT, reducing the pressure to 5 bars (72 PSI).

Table 8 - Recommended flow meter

Flow rate m^3/hr	Flow meter output l/pulse
Up to 6	1
6 - 60	10
60-600	100

Flow rate GPM	Flow meter output US gal/pulse
Up to 88	1
88 - 1000	10
1000-4500	100

ATTENTION

An air-release valve must be installed at the highest point of the water distribution system. If the highest point is the FERTIKIT upper manifold, install the air-release valve as shown.

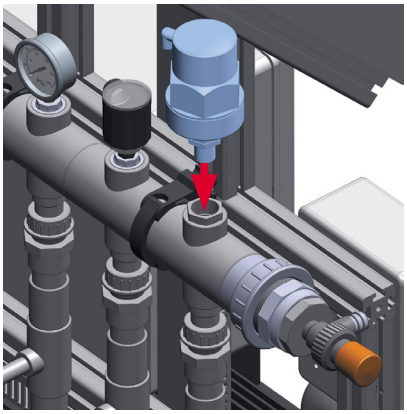


Fig 13

The fertilizer/acid tanks and lines

For the setup of the fertilizer/acid tanks and lines, the following components should be installed:

Table 9 - Items of the fertilizer/acid tanks and lines

Component	Specifications
13 Fertilizer/acid stock tank	Between 1 and 6 fertilizer/acid solution stock tanks
14 Manual valve (fertilizer)	A manual ball valve on each fertilizer/acid line at the stock tank outlet
15 Fertilizer/acid filter	≤ 130 µm (≥ 120 mesh)

The following aspects should be taken into account:

- Ensure the stock tanks are of sufficient size for storage of at least one day's consumption .
- Sufficient space should be available between the fertilizer/acid tanks and the FERTIKIT, to enable inspection and maintenance operations.
- Fertilizer/acid pipe diameter: 32 mm (1¼") for dosing channels of up to 400 l/hr (106 GPH)
  40 mm (1½") for dosing channels of over 400 l/hr (106 GPH)
- For the connection of fertilizer supply lines to the FERTIKIT, use a transparent, chemical-resistant, reinforced PVC water hose with an internal diameter of 16 mm that will not contract when there is a vacuum in the system.
- Use properly sealing stainless steel band clamps for the fertilizer/acid hose connection, type SS 316.

CAUTION

After completion of the hydraulic infrastructure, before the installation of the FERTIKIT, rinse the hydraulic infrastructure and fertilizer/acid lines and tanks by running water through them in order to wash away any residues (chips, shavings, sawdust) due to the setup work.

ON-SITE PREPARATIONS

Electrical preparation

Mains connection

CAUTION
Only qualified electricians are permitted to perform electrical installations!

The following components have to be provided in the installation:

- A readily accessible circuit breaker, rated according to the FERTIKIT's total rated power certified as a branch circuit over current protector (see Appendix 2 - Dosing Booster List, page 46), compliant with the national code and requirements.
- Grounding connection: ≤ 10 Ω.

For the selection of the wire size - consider (see Appendix 2 - Dosing Booster List, page 46):

- The FERTIKIT's total rated power.
- Whether the electricity supply is single-phase or three-phase.
  (if a dosing booster is not present in the system, select the single-phase, up to 1.5 kWatt option).

Table 10 - Mains wire size for single-phase system
3 wires: GND, N, L

Power source required (kWatt)	1 X 100-115 VAC	1 X 200-250 VAC
Up to 1.5	≥ 2.5 mm² (≤ 13 awg)	≥ 2.5 mm² (≤ 13 awg)
1.5-2	≥ 4 mm² (≤ 11 awg)	
2-3	≥ 6 mm² (≤ 9 awg)	

Table 11 - Mains wire size for three-phase system
5 wires: GND, N, L1, L2, L3

Power source required (kWatt)	3 X 200-250 VAC	3 X 400-480 VAC
Up to 1.5	≥ 2.5 mm² (≤ 13 awg)	≥ 2.5 mm² (≤ 13 awg)
1.5-2		
2-3		
3-4	≥ 4 mm² (≤ 11 awg)	
4-6	≥ 6 mm² (≤ 9 awg)	
6-8	≥ 10 mm² (≤ 7 awg)	≥ 4 mm² (≤ 11 awg)

INSTALLATION

Unpacking and placement

Check the ShockWatch label attached to the packaging and ensure the indicator is white.
If the indicator is red - act according to the instruction on the ShockWatch label.

Place the FERTIKIT package close to the irrigation system using forklift.

Gently open the packaging.

Remove the 4 screws and bolts connecting the FERTIKIT to the wooden pallet.

Remove plastic cover from controller (if existing).

Place the FERTIKIT in its position.

Adjust the legs so that the FERTIKIT is steady.

WARNING
MONITORED SHIPMENT
IF SHOCKWATCH INDICATOR IS RED:
1 Do not refuse shipment.
2 Make notation on delivery receipt and inspect for damage.
3 If damage is discovered, leave item in original container and packaging, and request immediate inspection from carrier within 15 days of delivery date (int'l 3 days).
SHOCKWATCH
WARNING
HANDLE WITH CARE
RED INDICATES ROUGH HANDLING.
IF RED, NOTE ON THE BILL OF LADING AND INSPECT PRODUCT.
SHOCKWATCH

Fig 14

Hydraulic installation

WARNING
When handling fertilizers, acid and other chemicals, always use protective equipment, gloves and goggles.

Main line inlet/outlet connection

Connect the appropriate pipes to the inlet and the outlet of the FERTIKIT according to the mode of the system (see Location of inlet, outlet and fertilizer/acid line connectors, page 21).

Table 12 - Two types of connection are available

Fittings (interchangeable)	Diameter
PVC, adaptor union - glue connector (installed)	50 mm
PVC, BSP or NPT nipple - male thread connector (supplied)	1.5"

Stock tank connection

Connect the fertilizer lines to the FERTIKIT according to the mode of the system (see Location of inlet, outlet and fertilizer/acid line connectors, page 21).

Table 13 - Three types of connection are available

Fittings (interchangeable)	Diameter
PVC, hose nozzle insert connector (installed)	16 mm
PVC, nipple - male thread connector (supplied)	1/2"
PVC, half union - female thread connector (supplied)	3/4"

INSTALLATION

Prior to flexi-tube connection, thread a stainless steel band clamp A on each flexi-tube hose.

Heat the tip of each Flexi tube hose in boiling water to make it flexible for insertion.

Connect flexi-tube hose from fertilizer lines to the hose-nozzle-insert connectors of dosing channels B, ensuring 1⁄2 meter (1.7 feet) of transparent, chemical-resistant, reinforced PVC water hose with an internal diameter of 16 mm that will not contract when there is a vacuum in the system.

Attach the stainless steel band clamp on each flexi-tube connection C and secure tightly.

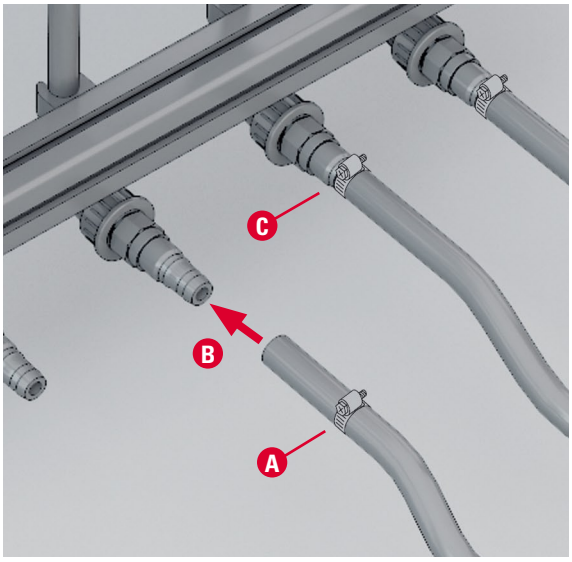


Fig 15

Flexi-tube specification:

- 16 mm (½") reinforced EVA tubing.
- Material: EVA (ethylene vinyl acetate) tube compound specially formulated to meet USDA requirements.
- Polyester cord reinforcement with color tracer.
- Pressure: 18 to 20 Bar (250 to 300 PSI).
- Recommended temperature range: -23°C to +65°C (-10°F to +150°F).

TIP

You can rotate the hose connectors of the dosing channels to face the desired direction according to the location of the stock tanks.
Loosen the Rotameter's lower connector A, rotate the hose connector to the desired direction B and fasten the Rotameter's lower connector A.

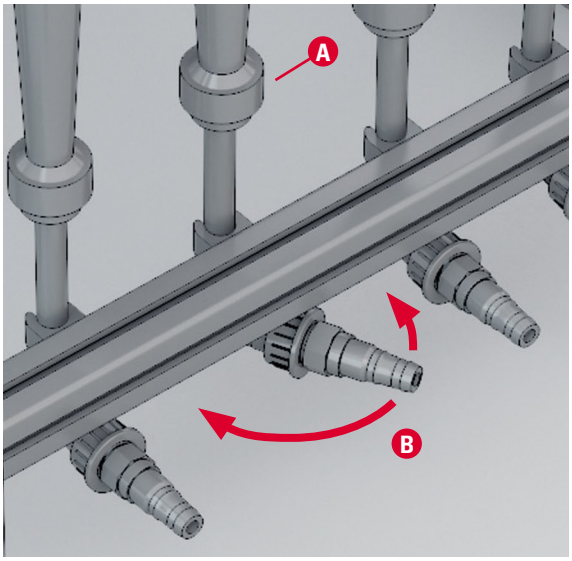


Fig 16

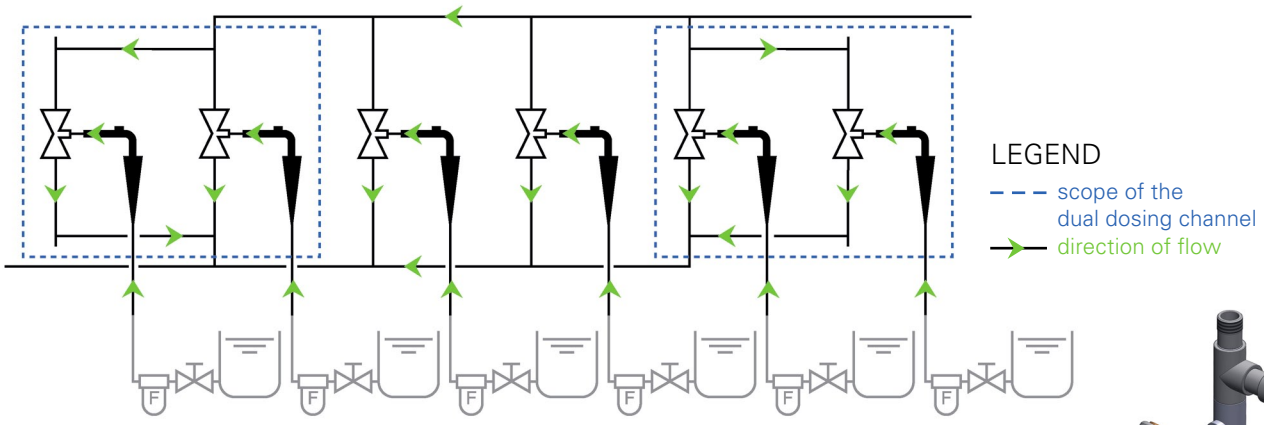
INSTALLATION

Dual dosing channel

If more than 4 dosing channels are required (up to 6), the dual dosing channel option is used, identifiable by the presence of 2 Venturis connected to a single manifold position.

- Up to 2 dual dosing channels can be installed on the FERTIKIT, at the farthest manifold positions (1 and 4).
- The dual dosing channel option is applicable only with the 600 l/hr (158 GPH) or the 1000 l/hr (265 GPH) Venturis.

Diagram 8 -



CAUTION

There are fertilizer combinations that should never be used in the dual dosing channel as they will induce crystalization and cause clogging of the pipes.

- Calcium Nitrate + Ammonium Sulfate => Calcium Sulfate
- Calcium Nitrate + Potassium Sulfate => Calcium Sulfate
- MKP + Calcium Nitrate => Calcium Phosphate
- MAP + Calcium Nitrate => Calcium Phosphate
- Phosphoric acid + Calcium Nitrate => Calcium Phosphate

In case of doubt regarding the use of any combination of fertilizers in the dual dosing channel, consult Netafim.

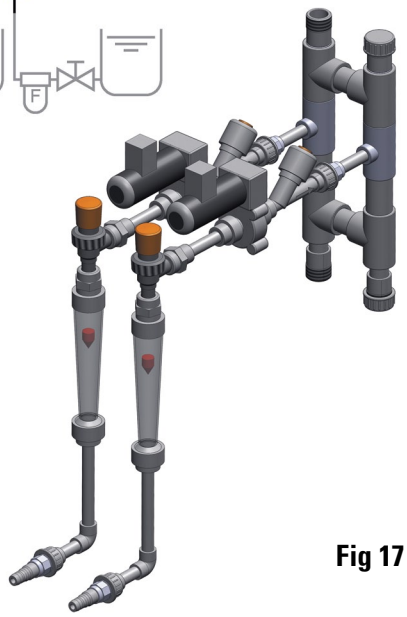


Fig 17

Electrical installation

CAUTION

Only qualified electricians are permitted to perform electrical installations!

Have a qualified electrician connect the FERTIKIT to the mains.

PD or MS mode - follow the instructions in the Controller User Manual.
PB or PL mode - follow the instructions in the Switchboard User Manual.

Options

EC/pH only - follow the instructions in the EC/pH Transducer User Manual.
No controller - follow the instructions in the Switchboard User Manual.

SYSTEM OPERATION

NOTE
The following procedure describes the operations that should be performed, regardless of the type of controller in use. For the operation of the specific controller interface, consult the Controller Manual.

Preparations for running the FERTIKIT

For FERTIKITs with a controller (onboard or external):

Run the controller and enter preliminary general settings (see the Controller Manual).

Ensure that the INPUT for protection against lack of pressure in the system is connected to the controller and defined, set a delay of 15 seconds (see the Controller Manual).

Connect all the elements (valves, pumps, filters, sensors, etc.) to the controller (see the Controller Manual).

Manual test of controller outputs

Perform the test to make sure that all the elements (valves, pumps, filters, sensors, etc.) function properly upon command from the controller.

Run the test using the controller's TEST menu (see the Controller Manual).

Set the relay status of the dosing channels to MANUAL
and make sure that the irrigation program is not defined (see the Controller Manual).

NOTE
When using a 1000 l/hr (265 USGal/hr) dosing valve (model: Fip S22), make sure the dosing valve selector is in the CLOSED position (Fig 18).

To check that the dosing channels are working:
When the OPEN command from the controller is given -
the LED on the dosing valve is lit.

Fig 18

Calibration of sensors

Calibrate the EC and pH sensors (see the EC/pH Transducer Manual).

CAUTION
Do not operate the FERTIKIT if the manual isolation valves installed at the inlet and outlet of the system are closed!

ATTENTION
Unions tend to get loose during transit.
Before operating the FERTIKIT, tighten all the unions of the FERTIKIT by hand.

Check for leaks

CAUTION
When opening or closing any manual valve, always do it gradually, to prevent damage to the system by water hammer.

Make sure all the field valves are closed.

Gradually open the isolation valves installed at the inlet and outlet of the system until the required main line pressure is attained.

Keep the system under static pressure for 10 minutes and visually check for leaks.

Perform a simulation test with a 10 liter (2 gallons) bucket of water. (see page 31)

Check the dosing booster operation

CAUTION
If isolation valves are installed at the FERTIKIT inlet and outlet, ensure that they are open before running the dosing booster.

Switch the dosing booster ON.
Check that the dosing booster is rotating in the correct direction (see the Dosing Booster Manual).

HIGH VOLTAGE ELECTRICAL HAZARD
Before unplugging the system from the main power source, switch the unit and the main power source OFF!

Running the FERTIKIT

Define a program in the controller for one valve or multiple valves (SHIFT) as defined by the irrigation plan (see the Controller Manual).

In the first stage it is recommended that you define a program with quantitative or proportional fertilization only, without EC/pH control (see the Controller Manual).

Temporarily deactivate all alarms in the system - EC/pH, flow control, etc. (see the controller manual).

Start the program and wait for the lines to be filled
(this takes a few minutes, depending on the size of the installation).

Check that the flow and the pressure on the main line are stabilized (see the Controller Manual).

Activate the dosing booster and the dosing channels.

Consult the main line flow meter and pressure gauge, the upper manifold and lower manifold pressure gauges and make sure all the hydraulic conditions are in range according to the following table:

Table 14 - Hydraulic conditions

Mode	Main line	Upper manifold	Lower manifold
PD	The pressure upstream from the PRV is not greater than +8 bar (+116 PSI) and at least twice the pressure downstream from the PRV (make sure there is suficient pressure for the field requirements)	The pressure in the upper manifold is at least twice the pressure in the lower manifold	
PL	+2.5 - +6.5 bar (+36 - +94 PSI)	Identical to the pressure on the main line	-0.5 - +0.8 bar (-7 - +12 PSI)
PB	+1 - +2.5 bar (+14 - +36 PSI)	+4 - +6.5 bar (+58 - +94 PSI)	+1 - +2.5 bar (+14 - +36 PSI)
MS	The main line pump is able to deliver the flow rate required for the operation of the FERTIKIT in addition to the field consumption. The pressure upstream from the main line pump is not greater than +0.5 bar (+7 PSI) The pressure at the outlet of the main line pump is not greater than +7 bar (+101 PSI)	The pressure at the outlet of main line pump	-0.3 - +0.3 bar (-4 - +4 PSI)

If the system cannot reach the hydraulic conditions, it is possible that there is an air pocket in the dosing booster's impeller chamber (see the Dosing Booster Manual):

Open the FERTIKIT sampling valve until a stable flow, free of air bubbles, is obtained.

If the system still cannot reach the hydraulic conditions - loosen the dosing booster's bleeding screw and wait until a stable flow, free of air bubbles, is obtained, then retighten the bleeding screw (see the Dosing Booster Manual).

Check the suction of the dosing channels from the stock tanks, and tune the desired flow rate for each dosing channel by adjusting the needle valve (see Calibration of the dosing unit while irrigating, page 33).

Let the system run for about ten minutes and see that it works properly.

After tuning the flow rate for each dosing channel, adjust the cursors on each Rotameter (Fig 19).

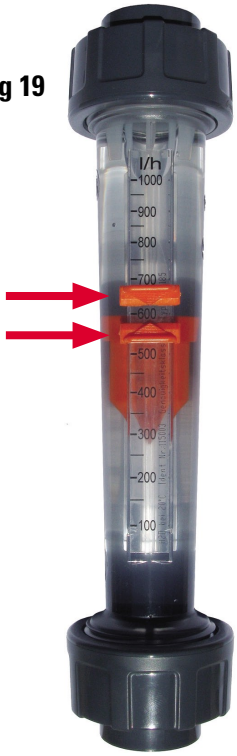


Fig 19

NOTE

The Rotameter's sacle is calibrated by the manufacturer for measurement of the flow rate of water (H_2O). Certain inacuracies may be observed when the flow rate of liquids with different densities, such as fertilizers and acids, is measured.

Measure the control cycle and enter the data into the controller - only if EC/pH measuring equipment is installed (see the Controller Manual).

Stop the program.

ATTENTION

Restore the settings of all the alarms back to the state where adequate protection to the system and the crop is provided (see the Controller Manual).

If there is any problem during the process, see Troubleshooting in the FERTIKIT User Manual.

CALIBRATION

The process of calibrating the FERTIKIT is carried out in three stages:

1. Calculation of dosing channels opening percentage

To finely calibrate the FERTIKIT in order to achieve homogeneous and stable dosing, perform the following calculation for each dosing channel (fertilizers and acid) to determine the amount of suction reduction needed to attain the required fertilizer/acid flow rate.

Metric units

			EXAMPLE	
Flow rate of the largest irrigation shift		m^3/hr	120	m^3/hr
	X		X	
Dosing ratio of a single fertilizer/acid		l/m^3	3	l/m^3
	=		=	
Result: a single fertilizer/acid flow rate		l/hr	360	l/hr
	X 1.25 =		X 1.25 =	
Result: target Rotameter reading		l/hr	450	l/hr

DEFINITION

$$\text{Dosing ratio} = \frac{\text{The quantity of fertilizer/acid (l)}}{1\ m^3 \text{ irrigation water}}$$

US units

			EXAMPLE	
Flow rate of the largest irrigation shift		GPM	500	GPM
	X		X	
Dosing ratio of a single fertilizer/acid		US gal/1000 US gal	15	US gal/1000 US gal
	X 0.06 =		X 0.06 =	
Result: a single fertilizer/acid flow rate		GPH	45	GPH
	X 1.25 =		X 1.25 =	
Result: target Rotameter reading		GPH	56	GPH

DEFINITION

$$\text{Dosing ratio} = \frac{\text{The quantity of fertilizer/acid (US gal)}}{1 \text{ THG (1000 US gal) irrigation water}}$$

NOTE

The Rotameter's sacle is calibrated by the manufacturer for measurement of the flow rate of water (H_2O). Certain inacuracies may be observed when the flow rate of liquids with different densities, such as fertilizers and acids, is measured.

2. Simulation test with a 10 liter (2 US gal) bucket of water

Instruments needed

- Good-quality portable EC and pH sensors, finely calibrated
- Calibration solutions for EC and pH
- Bucket with a scale for up to 10 liters (2 US gallons)
- Measuring tube or syringe with a scale for up to 100 cc (1 oz)
- Clean (preferably distilled) water for cleaning sensors during calibration
- Blotting paper for cleaning and drying

The client prepares the fertilizer solutions and the acid solution (if required) in the stock tanks according to the recipe advised by the agronomist/consultant.

ATTENTION

Ensure the fertilizers and acid solutions in the stock tanks have been thoroughly agitated before starting the simulation.

CALIBRATION

Note the required dosing ratio of each fertilizer solution and the dosing ratio of the acid solution (if used).

Fill a bucket with 10 liters (2 US gallons) of the client's supply water (without fertilizer or acid).

Measure the EC and the pH levels of the water in the bucket using calibrated portable sensors.

EXAMPLE

	EC	pH
Supply water (without fertilizer or acid)	0.3	7.8

Using a measuring tube or a syringe, take a dose from each fertilizer solution and from the acid solution (if used) according to the proportions determined by the dosing ratio (see example below) and **mix thoroughly** with the water in the bucket.

EXAMPLE

Metric units
For a fertilizers dosing ratio of 5 l/m³ each
and an acid dosing ratio of 2 l/m³
the quantities for 10 liters of water in the
Bucket-simulation-test will be
50 cc of each fertilizer solution and
20 cc of the acid solution

US units
For a fertilizers dosing ratio of 1.5 US gal/THG each
and an acid dosing ratio of 1.1 US gal/THG
the quantities for 2 US gallons of water in the
Bucket-simulation-test will be
0.38 oz* of each fertilizer solution and
0.28 oz** of the acid solution

DEFINITIONS
1 US gal = 128 oz

* $\frac{1.5 \times 2}{1000}$ = 0.003 US gal = 0.384 oz

** $\frac{1.1 \times 2}{1000}$ = 0.0022 US gal = 0.28 oz

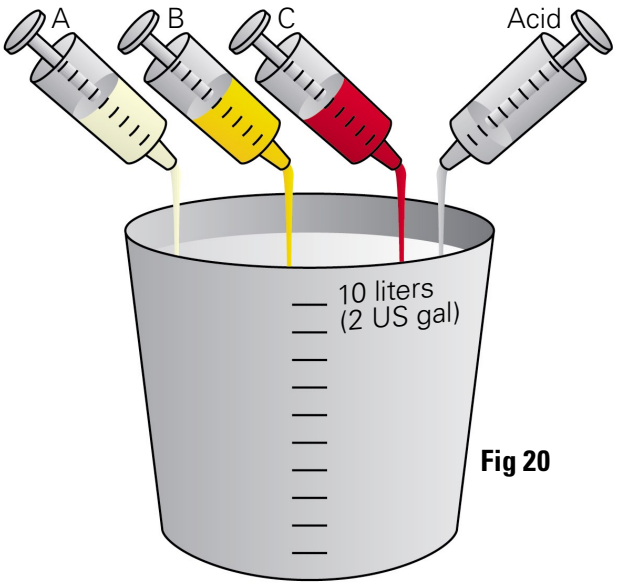


Fig 20

Measure the EC and the pH levels of the mixture in the bucket using calibrated portable sensors.

Compare the measured EC and pH values to the target values set by the agronomist/consultant.

EXAMPLE

	EC	pH
After adding the fertilizers and acid	1.6	5.5
Target values	1.8	5.8
Deviation from target value	11%	5%

CALIBRATION

With the controller set to operate according to EC/pH values - if the EC and pH values measured in the bucket are within a range of ±30% deviation from the target values, the system will be able to correct them automatically.

If the values are out of the ±30% range, check the data and consult the agronomist/consultant.

3. Calibration of the FERTIKIT while irrigating

WARNING
Extreme EC or pH values may damage the crop.
Perform the following procedure only after completing stage 2 above (Simulation test with a 10 liter or 2 US gallon bucket of water) with satisfactory results.

NOTE
The following steps explain the operations to be performed, regardless of the type of controller used. For the operation of your controller's interface, consult the Controller Manual.
However, since the NMC Pro controller is widely used - its interface screens for the execution of each step are noted.

NOTE
Before the calibration, confirm that the EC and the pH sensors of the FERTIKIT have been calibrated according to the instructions in the EC/pH Installation Manual.

Define the dosing configuration, while the EC and pH controls are in the OFF position **(NMC Pro - screen 7.7).**

In the EC and pH alarm definitions, set the EC and pH alarm to the OFF position (deactivated) **(NMC Pro - screen 3.6).**

Enter the data for the irrigation valves, and the dosing ratio for each dosing channel **(NMC Pro - screens 1.1-1.2-1.3).**

Run the program **(NMC Pro - screen 2.2).**

Allow a few minutes for the pipes to fill up and the flow rate to stabilize.

Reduce the suction of the dosing channels by adjusting the manual needle valve of each dosing channel until the "target Rotameter reading" calculated in stage 1 (page 24) is attained.

NOTE
The Rotameter's sacle is calibrated by the manufacturer for measurement of the flow rate of water (H_2O). Certain inacuracies may be observed when the flow rate of liquids with different densities, such as fertilizers and acids, is measured.

Check the appropriate controller screen for the measured EC and pH values **(NMC Pro - hot screen 4)**.
If the desired values have been reached, check opening percentages of the dosing valves.

The EC and pH target values should be attained with the dosing valves opened to 50% - 80% of their capacity.

If the EC and pH target values are attained with the dosing valves opened less than 50%, reduce the dosing channel suction rate, until the EC and pH target values are reached.

NOTE
Every change in the flow rate of the needle valve must be updated afterwards in the controller **(NMC Pro - screen 7.6).**

CALIBRATION

If the EC and pH target values cannot be attained, and the dosing valves are opened more than 85%, measures should be taken to increase the dosing ratio - if feasible, slightly increase the concentration of the fertilizer solution and/or reduce the water flow rate to the field during irrigation.
If not - consult the agronomist/consultant.

In a field where the flow rate changes significantly from one irrigation shift to the next, try to be at a minimum of 50% dosing valve opening for the low flow rate shift, and a maximum of 80% for the high flow rate shift.

When the calibration process is completed, return to the EC and pH control screen in the controller, define the deviation in EC and pH values for the channels and switch the EC and pH control to ON **(NMC Pro - screen 7.7-7.6).**

In the EC and pH alarm definitions, define the EC and pH deviation from the target values that, if attained, will trigger the alarm and set the EC and pH alarm to the ON position (activated) **(NMC Pro - screen 3.5-3.6).**

NOTE
EC and pH values must not exceed a ±30% deviation from the target values.

ATTENTION
Once a month, read the measured flow rates of the dosing channels and compare them with the flow rates defined in the controller, in order to check whether changes have occurred **(NMC Pro - screen 7.6).**

After completing the calibration process, fill out the FERTIKIT Hydraulic Conditions Checklist in three copies. Make sure to fill out all the boxes of the reference row.

COMMISSIONING

After completing the calibration process, the FERTIKIT is ready for commissioning.

Familiarize the client with the FERTIKIT, the user manual and the accompanying documents and emphasize the following points:

- The importance of following all the safety instructions (see User Manual, page 6).
- The warranty and its restrictions (see User Manual, page 23).
- Calibration - accompany the client through this chapter and emphasize the importance of thorough knowledge of the processes in it for the current operation of the FERTIKIT (see User Manual, page 24).
- Proper dissolving of fertilizers for optimal utilization of the dosing channels' capacity (see User Manual, page 24).
- The importance of regular maintenance and its impact on the warranty (see User Manual, page 17).
- The importance of periodically comparing the hydraulic data with the references in the FERTIKIT Hydraulic Conditions Checklist (see User Manual, page 17).
- Troobleshooting - accompany the client through this chapter (see User Manual, page 19).
- Make sure the FERTIKIT Hydraulic Conditions Checklist has been properly filled.
- Fill out the FERTIKIT Commissioning Report.
- Keep one copy of both documents, give a copy to the client as reference for calibration of the FERTIKIT in the future and send a copy to cmt.support@netafim.com.

WARRANTY

Netafim warrants all the components of the FERTIKIT to be free of defects in material and workmanship for 1 (one) year from the date of installation, provided the installation has been reported to Netafim within 30 days of installation.

If the installation was not reported or was reported later than 30 days from the date of installation, Netafim will warrant the FERTIKIT for a period of 18 months from the date of production, according to its serial number.

If a defect is discovered during the applicable warranty period, Netafim will repair or replace, at its discretion, the product or the defective part.

The above does not apply to EC and pH sensors, since they are wearable. Netafim will warrant these items to be free of defects in material and workmanship for 3 months from the date of installation, provided the installation has been reported to Netafim within 30 days, or 6 months from date of production if installation was not reported or was reported later than 30 days from the date of installation.

CAUTION

When not installed, the pH sensor must be immersed in KCL solution (supplied with the sensor) or in calibration buffer 4 at temperature 18-25˚C (64-77˚F), protected from freezing and not be exposed to pressure greater than 6 bars (87 PSI).
Damage due to these causes is not covered by warranty.

This warranty does not extend to repairs, adjustments or replacements of a FERTIKIT or part that results from misuse, negligence, alteration, force majeure, lightning, power surge, improper installation or improper maintenance.

If a defect arises in your Netafim product during the warranty period, contact your Netafim supplier.

Limited warranty

This warranty is subject to the conditions in Netafim's official warranty statement.
(For the full text of Netafim's official warranty statement, please contact Netafim).

APPENDIX 1 - FERTIKIT PART LIST

Modes

PD

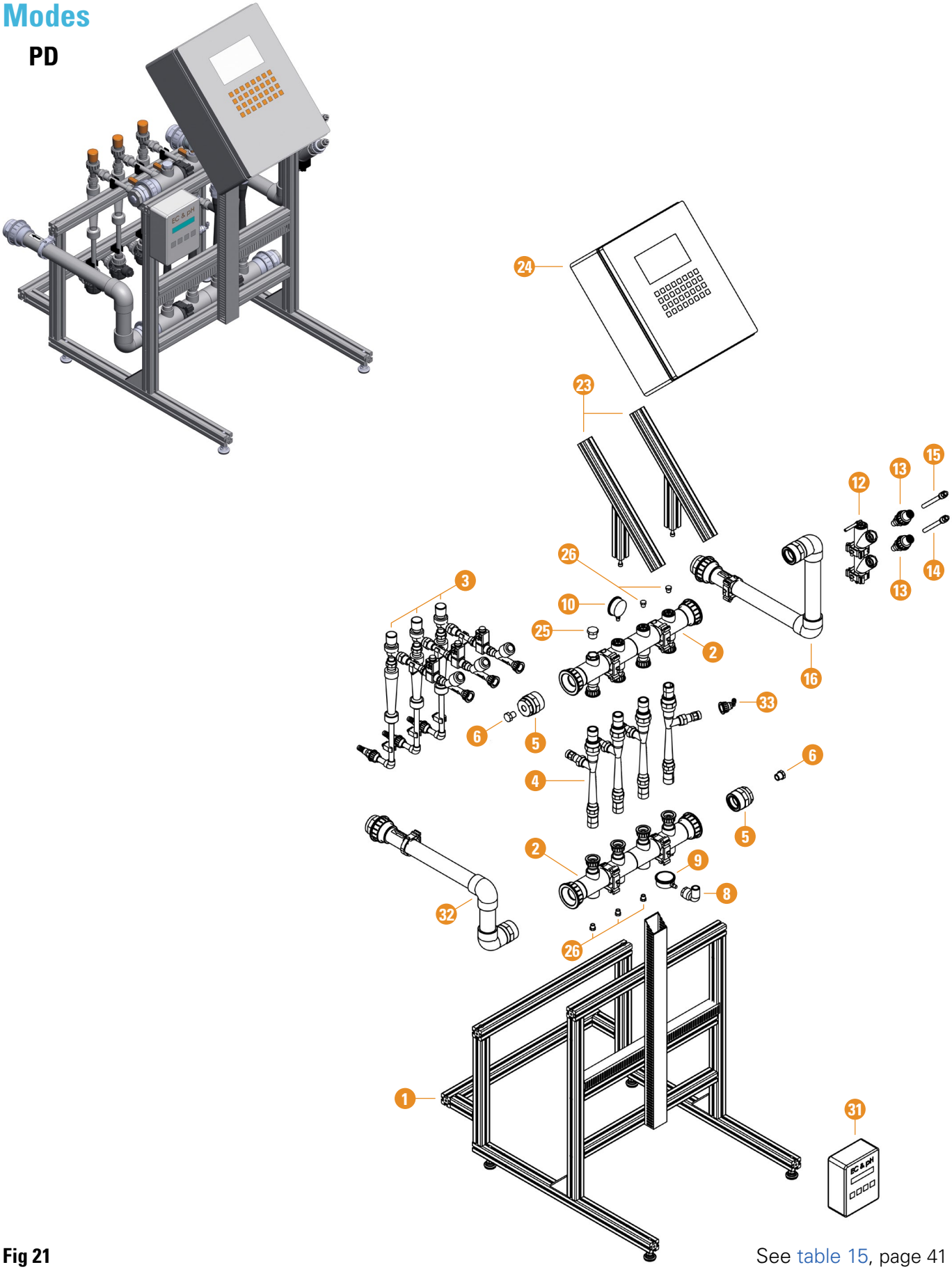


Fig 21

See table 15, page 41

APPENDIX 1 - FERTIKIT PARTS LIST

PL

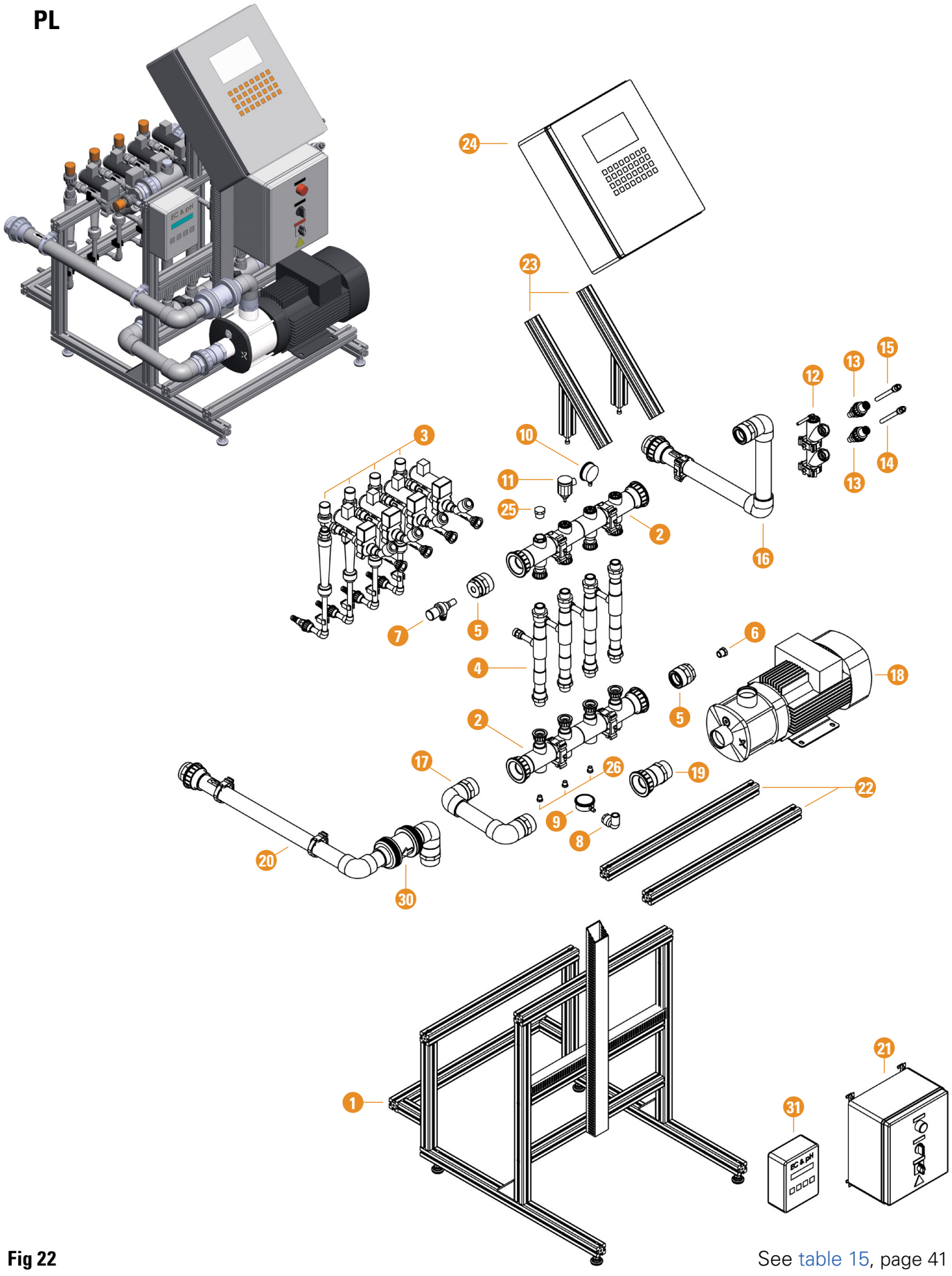


Fig 22

See table 15, page 41

APPENDIX 1 - FERTIKIT PARTS LIST

PB

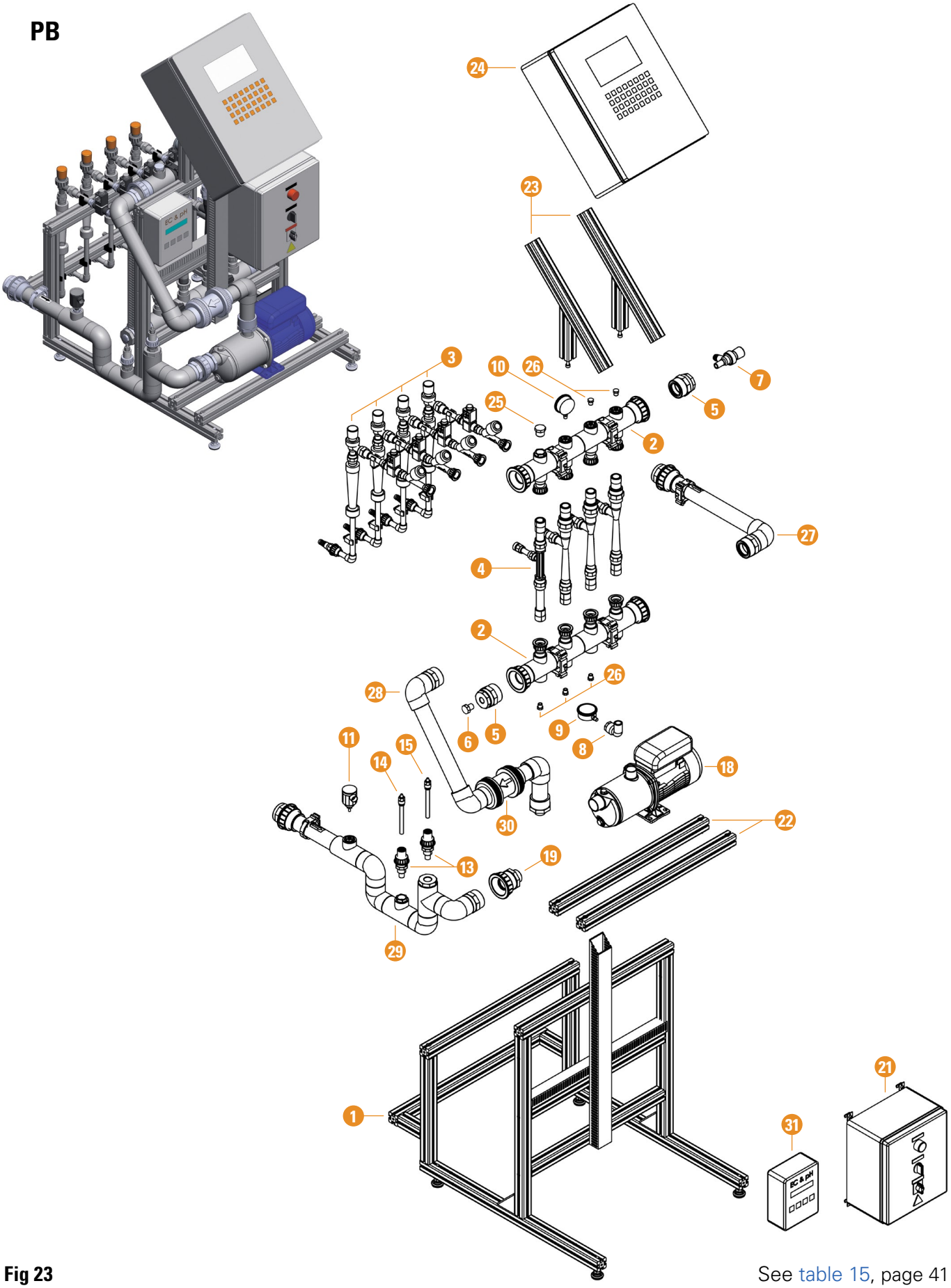


Fig 23

See table 15, page 41

APPENDIX 1 - FERTIKIT PARTS LIST

MS

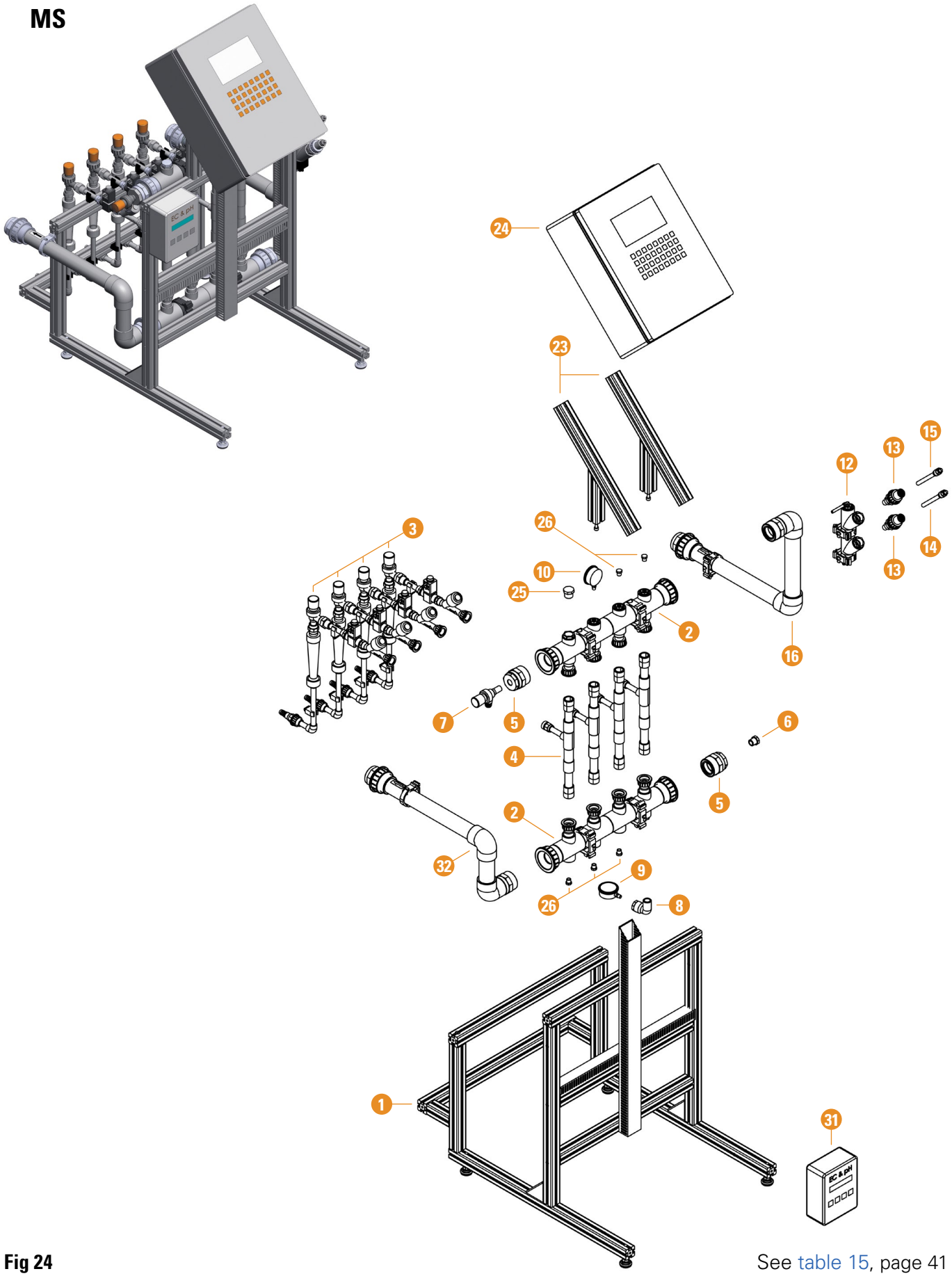


Fig 24

See table 15, page 41

APPENDIX 1 - FERTIKIT PARTS LIST

Table 15 - Main parts for 4 modes

Part	Description	Notes	Cat. No.
1	Basic frame	Not availabe as spare part	
2	Upper / lower manifold	Upper / Lower	33240-002100
3	Dosing channel	See table 16, pages 42-43	
4	Venturi	See table 17, page 44	
5	Reducer 50mm - 1/2"		33240-002251
6	PVC threaded plug 1/2" - male		77300-016010
7	Sampling valve		77500-004950
8	Elbow for vacuum gauge		33240-004100
9	Vacuum gauge - model 250 1-5 ATM (14.7-73.5 PSI) 1/4" BSP		77540-004150
10	Pressure gauge - 250 GLZ 8 bar (116 PSI) 1/4" BSP		77540-003350
11	Pressure switch - 1-3 bar (14.5-43.5 PSI) 0.3 bar (4.35 PSI) difference, 1/4"	Only for PL/PB Modes	77800-002180
12	Manifold for EC & pH sensors	Not relevant for PB Mode	33240-003050
13	Union adaptor set for EC/pH sensor		33120-008500
14	pH sensor - 12mm glass		45000-006692
15	EC sensor temperat comp. 10K 12mm		45000-006690
16	Inlet for PL/MS/PD		33240-003100
17	PL - U connection to dosing booster inlet	Only for PL Mode	33240-002650
18	Dosing booster	See table 18, page 45	
19	Dosing booster inlet adaptor 1½"	See table 18, page 45	
20	PL - dosing booster outlet (including check valve)	Only for PL Mode (see Table 18, page 45). The check valve can be ordered separately (see Part No. 30 below)	
21	Switchboard	Not availabe as spare part. (see Switchboard Manual)	
22	Set - Aluminum frame for dosing booster	One per dosing booster	45000-008759
23	Set - Aluminum frame for NMC Pro controller	Suitable for NMC Pro	45000-008757
	Set - Aluminum frame for NMC Junior controller	Also suitable for NMC DC	45000-008758
24	Controller	Complete controller is not available as spare part (See Controller Manual).	
25	PVC threaded plug 3/4" - male		77400-027100
26	Plug 1/4"		77300-016000
27	PB outlet	Only for PB Mode	33240-002150
28	PB - dosing booster outlet (including check valve)	Only for PB Mode (see Table 18, page 45). The check valve can be ordered separately (see Part No. 30 below)	
29	PB inlet		33240-002500
30	Check valve 50-50mm	Can be ordered separately	77300-025045
31	EC/pH transducer		73220-003740
32	MS/PD outlet	Only for MS/PD Modes	33240-003150
33	PD - suction unit EC&pH measurement via Venturi	Only for PD Mode	33240-004150

APPENDIX 1 - FERTIKIT PARTS LIST

Dosing channel

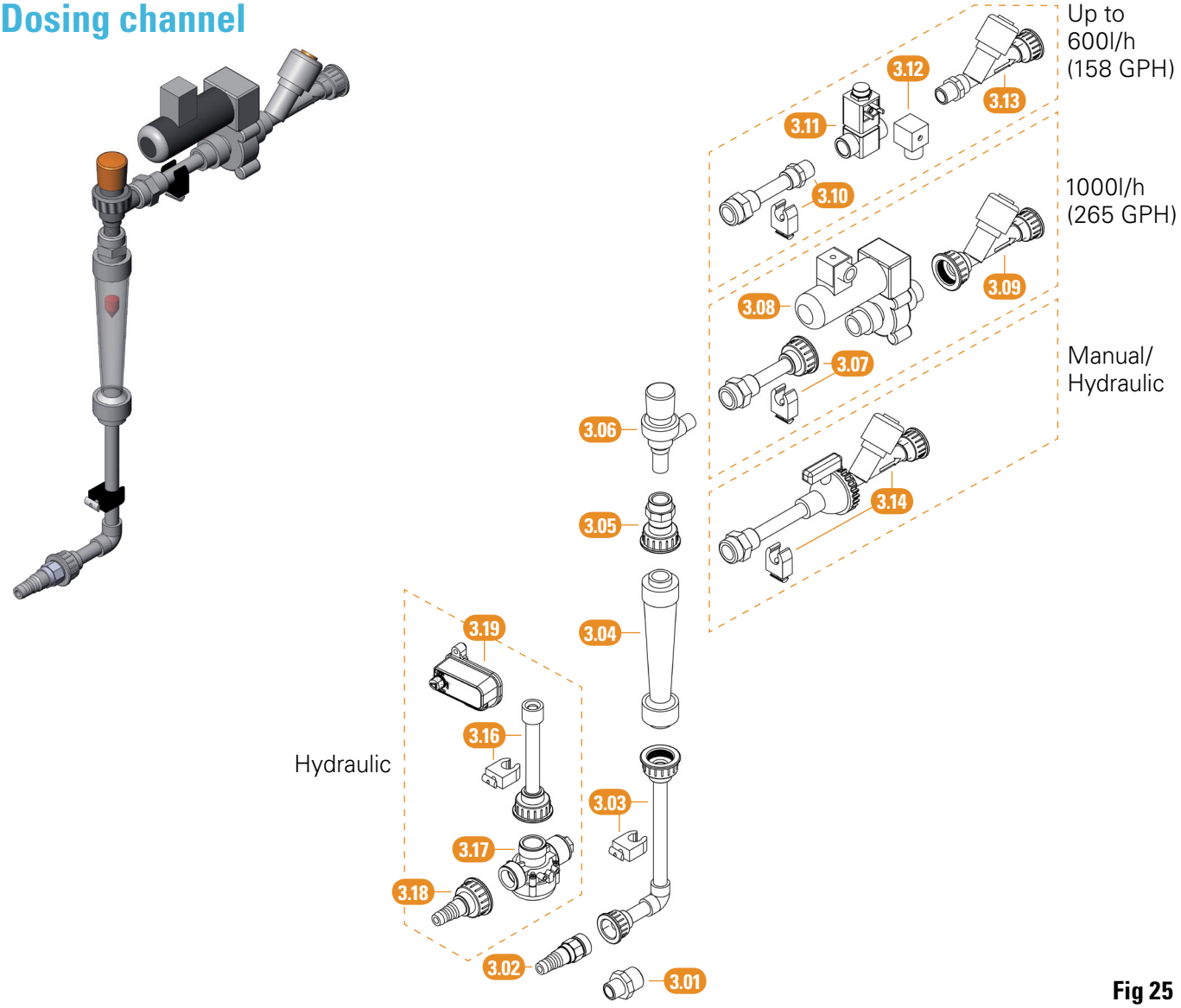


Fig 25

Table 16 - Dosing channel parts

Part	Description	Notes	Cat. No.
3.01	Nipple 3/4" 1/2"		77300-010470
3.02	FSP - Hose nozzle end connector for dosing channel		33240-004200
3.03	FSP - Dosing channel connection between hose nozzle and Rotameter valve DFM170	Suitable for dosing channels 50l/h (13 GPH), 150l/h (40 GPH) and 400l/h (106 GPH)	33240-004250
	FSP - Dosing channel connection between hose nozzle and Rotameter valve DFM185	Suitable for dosing channels 600l/h (158 GPH) and 1000l/h (265 GPH)	33240-004300
3.04	Rotameter DFM170 5-50 l/hr (1.3-13 GPH)		77540-007560
	Rotameter DFM170 15-150 l/hr (4-40 GPH)		77540-007575
	Rotameter DFM170 40-400 l/hr (10.6-106 GPH)		77540-007570
	Rotameter DFM185 60-600 l/hr (15.8-158 GPH)		77540-007577
	Rotameter DFM185 100-1000 l/hr (26.5-265 GPH)		77540-007580

Continued on the next page

APPENDIX 1 - FERTIKIT PARTS LIST

Table 16 - Dosing channel parts (continued)

Part	Description	Notes	Cat. No.
3.05	FSP - Dosing channel connection between Rotameter and needle valve DFM170	Suitable for dosing channels 50l/h (13 GPH), 150l/h (40 GPH) and 400l/h (106 GPH)	33240-004350
	FSP - Dosing channel connection between Rotameter and needle valve DFM185	Suitable for dosing channels 600l/h (158 GPH) and 1000l/h (265 GPH)	33240-004400
3.06	Needle valve RPRV 1/2" FPM, 1000l/h (265 GPH), Fip		77500-004850
3.07	FSP - Dosing channel connection between needle valve and dosing valve S22	Suitable for dosing channels 1000 l/h (265 GPH) with dosing valve Fip S22	33240-004450
3.08	Dosing valve S22	Suitable for dosing channels 1000 l/h (265 GPH)	77540-008500
3.09	FSP - Dosing channel connection + check valve EPDM between dosing valve S22 and Venturi	Suitable for dosing channels 1000 l/h (265 GPH) with dosing valve Fip S22	33240-004600
3.10	FSP - Dosing channel connection between needle valve and Baccara dosing valve	Suitable for dosing channels up to 600 l/h (158 GPH) with Baccara dosing valve	33240-004650
3.11	Baccara dosing valve 1/2" + Viton 24VAC 50Hz	Suitable for concentrated acid dosing channels 50Hz	70800-001770
	Baccara dosing valve 1/2" + Viton 24VAC 60Hz	Suitable for concentrated acid dosing channels 60Hz	70800-001780
	Baccara dosing valve 1/2" + EPDM 24VAC 50Hz	Suitable for fertilizer or diluted acid dosing channels 50Hz	70800-001785
	Baccara dosing valve 1/2" + EPDM 24VAC 60Hz	Suitable for fertilizer or diluted acid dosing channels 60Hz	70800-001790
3.12	Plug PE17A + cable 3m (10 feet) + LED for dosing valve	Only for Baccara dosing channels	77800-004010
3.13	FSP - Dosing channel connection + EPDM check valve between Baccara dosing valve and Venturi	Suitable for dosing channels up to 600 l/h (158 GPH) with Baccara dosing valve	33240-004700
	FSP - Dosing channel connection + Viton check valve between Baccara dosing valve and Venturi	Suitable for concentrated acid dosing channels	33240-004750
3.14	FSP - Dosing channel manual ball valve and EPDM check valve replacement	Suitable for any manual dosing channel	33240-004800
3.16	FSP - Dosing channel connection between NC valve and Rotameter valve DFM170	Suitable for hydraulic dosing channels 50l/h (13 GPH), 150l/h (40 GPH) and 400l/h (106 GPH)	33240-005000
	FSP - Dosing channel connection between NC valve and Rotameter valve DFM185	Suitable for hydraulic dosing channels 600l/h (158 GPH) and 1000l/h (265 GPH)	33240-005100
3.17	AM. 3/4" NC hydraulic valve	Suitable for hydraulic dosing channels	74480-011100
3.18	FSP - Hose nozzle end connector for hydraulic dosing channel	Suitable for hydraulic dosing channels	33240-005200
3.19	Aquative DC (CV 606)	Suitable for hydraulic dosing channels	35500-001900

APPENDIX 1 - FERTIKIT PARTS LIST

Venturis

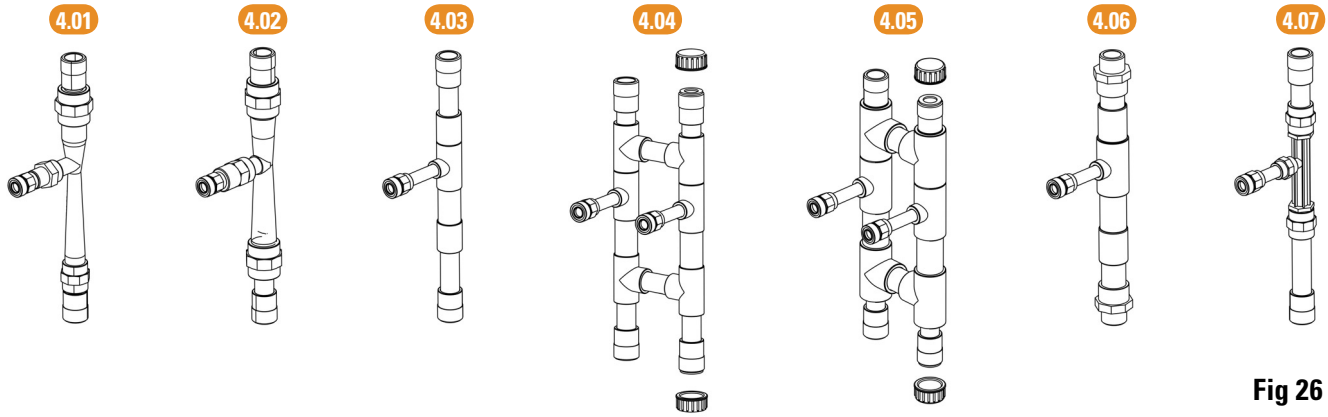


Fig 26

Table 17 - Venturis

Part	Description	Notes	Cat. No.
4.01	Venturi - PP-N150		33240-002300
4.02	Venturi - PP-M250		33240-002320
4.03	Venturi - PVC-N600	Only for PL/MS Modes	33240-002370
4.04	Venturi - PVC-N600 Dual		33240-002375
4.05	Venturi - PVC-N1000 Dual		33240-002380
4.06	Venturi - PVC-N1000		33240-002390
4.07	Venturi - PVDF-M50		33240-003200

APPENDIX 1 - FERTIKIT PARTS LIST

Dosing booster and its accessories

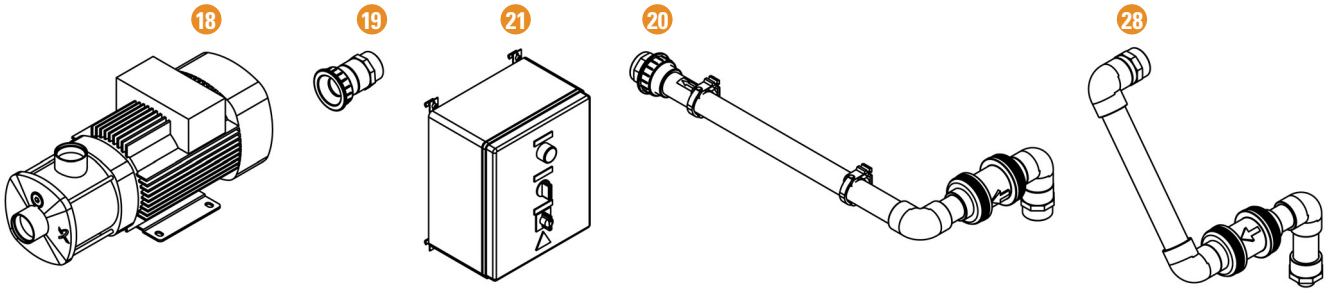


Fig 27

Each dosing booster (pump) has its apropriate accessories - inlet adaptor, outlet and switchboard.
Each row in table 18 displays a dosing booster and its set of a accessories.
After identifying the required part, go to table 18a below for the description and the Catalog number.

Table 18 - Dosing booster and its accessories

Frequency	Dosing booster** 18		Pump inlet adaptor 19	Switchboard 21	Pump outlet*	
					For **PL** mode 20	For **PB** mode 28
50Hz	4HM9	18.01	19.01	21.01	20.01	28.01
	CM5-9	18.03	19.01	21.02	20.03	
	CM15-4	18.02	19.02	21.03	20.02	
60Hz	4HM96	18.04	19.01	21.01	20.01	28.01
	CM5-6	18.06	19.01	21.02	20.05	
	CM15-3	18.05	19.02	21.03	20.04	

*When selecting the pump outlet, be sure to consider the mode of the FERTIKIT.
**For other types of dosing boosters - consult Netafim.

Table 18a - Dosing booster and accessories

Part	Description	Cat. No.
18.01	Lowara pump 4HM9 1-phase 1X220V 50HZ	77800-004330
18.02	Grunfos pump CM15-4 3-phase 50HZ	77800-003008
18.03	Grunfos pump CM5-9 3-phase 50HZ	77800-003007
18.04	Lowara pump 4HM96 1-phase 1X220V 60HZ	77800-004340
18.05	Grunfos pump CM15-3 3-phase 60HZ	77800-003011
18.06	Grunfos pump CM5-6 3-phase 60HZ	77800-003009
19.01	FSP - Pump inlet adaptor 1¼"	33240-002660
19.02	FSP - Pump inlet adaptor 2"	33240-002666

Part	Description	Cat. No.
20.01	FSP - PL - Pump outlet 1" 4HM9	33240-002670
20.02	FSP - PL - Pump outlet 2" CM15-4	33240-002635
20.03	FSP - PL - Pump outlet 1" CM5-9	33240-002675
20.04	FSP - PL - Pump outlet 2" CM15-3	33240-002630
20.05	FSP - PL - Pump outlet 1" CM5-6	33240-002676
21.01	FC-SWB-LUB12 1-phase	Complete switchboard is not available as spare part (See Switchboard Manual for spare parts)
21.02	FC-SWB-LUB12 3-phase	
21.03	FC-SWB-LUB32 3-phase	
28.01	FSP - PB - Pump outlet 1" 4HM9	33240-002450

APPENDIX 2 - DOSING BOOSTER LIST

Dosing booster list

- The dosing boosters in **bold characters** are regularly in stock, enabling a shorter delivery time.

Table 19 - For 50 Hz installations

	Mains voltage	Description	Pump electrical data	FERTIKIT total rated power
1-phase	1x230V	**Lowara 4HM9**	Rated power: P2: 1.48 kW Rated voltage: 1 x 230 V Rated current: 6.49 A	1.63 kW
	1x220-240V	Grundfos CM5-7	Rated power: P2: 1.3 kW Rated voltage: 1 x 220-240 V Rated current: 8,4-8,0 A	1.45 kW
	1x220-240V	Grundfos CM5-9	Rated power: P2: 1.9 kW Rated voltage: 1 x 220-240 V Rated current: 11,0-10,0 A	2.05 kW
	1x220-240V	Grundfos CM10-3	Rated power: P2: 1.9 kW Rated voltage: 1 x 220-240 V Rated current: 11,0-10,0 A	2.05 kW
3-phase	3x400V	Lowara 4HM9T	Rated power: P2: 1.48 kW Rated voltage: 3 x 230D/400Y V Rated current: 4.2/2.43 A	1.63 kW
	3x220-240/380-415V	Grundfos CM5-7	Rated power: P2: 1.58 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 5,55-5,38/3,25-3 A	1.73 kW
	3x220-240/380-415V	**Grundfos CM5-9**	Rated power: P2: 2.2 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 8,05-7,5/4,7-4,35 A	2.35 kW
	3x220-240/380-415V	Grundfos CM10-3	Rated power: P2: 2.2 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 8,05-7,5/4,7-4,35 A	2.35 kW
	3x220-240/380-415V	Grundfos CM10-4	Rated power: P2: 3.2 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 11,8-11,0/6,75-6,40 A	3.35 kW
	3x220-240/380-415V	Grundfos CM10-5	Rated power: P2: 3.2 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 11,8-11,0/6,75-6,40 A	3.35 kW
	3x220-240/380-415V	Grundfos CM10-6	Rated power: P2: 4 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 14,0-13,2/8,20-7,80 A	4.15 kW
	3x220-240/380-415V	Grundfos CM10-8	Rated power: P2: 5.8 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 20,4-19,0/11,8-11,0 A	5.95 kW
	3x220-240/380-415V	Grundfos CM15-3	Rated power: P2: 4 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 14,0-13,2/8,20-7,80 A	4.15 kW
	3x220-240/380-415V	**Grundfos CM15-4**	Rated power: P2: 4 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 14,0-13,2/8,20-7,80 A	4.15 kW
	3x220-240/380-415V	Grundfos CM25-4	Rated power: P2: 7.4 kW Rated voltage: 3 x 220-240D/380-415Y V Rated current: 25,5-26,5/14,8-15,4 A	4.15 kW

APPENDIX 2 - DOSING BOOSTER LIST

Table 20 - For 60 Hz installations

	Mains voltage	Description	Pump electrical data	FERTIKIT total rated power
1-phase	1x230V	**Lowara 4HM96**	Rated power: P2: 1.1 kW Rated voltage: 1 x 230 V Rated current: 4,93 A	1.25 kW
	1x115/230V	Grundfos CM5-4	Rated power: P2: 1.5 kW Rated voltage: 1 x 115/230 V Rated current: 19,5/9,8 A	1.65 kW
3-phase	3x380V	Lowara 4HM96T	Rated power: P2: 1.1 kW Rated voltage: 3 x 230D/3800Y V Rated current: 4.2/1.85 A	1.25 kW
	3x208-230/440-480V	Grundfos CM5-4	Rated power: P2: 1.7 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 6,25-5,85/2,98-2,85 A	1.85 kW
	3x208-230/440-480V	**Grundfos CM5-6**	Rated power: P2: 2.5 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 8,95-8,5/4,3-4 A	2.65 kW
	3x208-230/440-480V	Grundfos CM10-2	Rated power: P2: 2.5 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 8,95-8,5/4,3-4 A	2.65 kW
	3x208-230/440-480V	Grundfos CM10-3	Rated power: P2: 4 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 14,8-14,2/7,2-7,0 A	4.15 kW
	3x208-230/440-480V	Grundfos CM10-4	Rated power: P2: 6 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 21-20,4/10,5-10,2 A	6.15 kW
	3x208-230/440-480V	Grundfos CM10-5	Rated power: P2: 6 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 21-20,4/10,5-10,2 A	6.15 kW
	3x208-230/440-480V	Grundfos CM15-2	Rated power: P2: 4 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 14,8-14,2/7,2-7,0 A	4.15 kW
	3x208-230/440-480V	**Grundfos CM15-3**	Rated power: P2: 6 kW Rated voltage: 3 x 208-230YY/440-480Y V Rated current: 21-20,4/10,5-10,2 A	6.15 kW

GROW MORE WITH LESS

WWW.NETAFIM.COM